California Environmental Protection Agency

Air Resources Board

APPENDICES

For Report

Ambient Air Monitoring for Acephate and Methamidophos In Fresno County – Summer 2002

Prepared by
Operations Planning and Assessment Section
Quality Management Branch
Monitoring and Laboratory Division

Project No. P-02-003

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Protocol for the Application and Ambient
Air Monitoring for Acephate and Methamidophos
In Fresno County During Summer, 2002

California Environmental Protection Agency

Air Resources Board

Draft

Protocol for the Application and Ambient Air Monitoring for Acephate and Methamidophos In Fresno County During Summer, 2002

Quality Management Branch
Monitoring and Laboratory Division

Project No.
P-02-003

Date: July 17, 2002

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This protocol has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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In Fresno County During Summer, 2002

I. Introduction

At the request (January 2, 2002, Memorandum, Helliker to Lloyd) of the California Department of Pesticide Regulation (DPR), the Air Resources Board (ARB) staff will determine airborne concentrations of the pesticides acephate and methamidophos in Fresno County over a seven week ambient monitoring program and over three day application monitoring programs. This monitoring will be done to fulfill the requirements of AB 1807/3219 (Food and Agricultural Code, Division 7, Chapter 3, Article 1.5) which requires the ARB to "...document the level of airborne emissions ... of pesticides which may be determined to pose a present or potential hazard..." when requested by the DPR. The ambient monitoring will be conducted for seven consecutive weeks between July 8 and August 23, 2002 to coincide with the use of these two organophosphate chemicals as insecticides. California growers use acephate and methamidophos to control a variety of plant and soil insects.

The sampling and analysis for acephate and methamidophos will follow the procedures and quality assurance guidelines described in the "Quality Assurance Plan for Pesticide Air Monitoring" (May 11, 1999 version) included as Attachment I as well as the procedures described in the "Standard Operating Procedure for the Sampling and Analysis of Methamidophos and Acephate in Ambient and Application Air Monitoring using Gas Chromatography with a Nitrogen-Phosphorous Detector and a Flame Photometric Detector" (Attachment II) and the pesticide adsorbent tube sampling procedures outlined in Attachments IV and V.

II. Sampling

Samples will be collected by passing a measured volume of ambient air through XAD-2 resin. The sampling manifold is shown in Figure 1. The exposed XAD-2 resin tubes (SKC #226-30-06) are stored in an ice chest (on dry ice) or in a freezer until desorbed with organic solvent. The tubes are 8 mm x 110 mm with 400 mg XAD-2 in the primary section and 200 mg in the secondary section. The flow rate of 3.0 standard liters per minute (slpm) will be accurately measured and the sampling system operated continuously for 24 hours (ambient) with the exact operating interval recorded in the log book. The tubes will be protected from direct sunlight and supported about 1.5 meters above the ground during application monitoring sampling periods and 1.5 meters above roof tops for the ambient monitoring. At the end of each sampling period, the tubes will be placed in culture tubes with an identification label affixed. Subsequent to sampling, the sample tubes will be transported on dry ice, as soon as reasonably possible, to the

ARB Monitoring and Laboratory Division laboratory for analysis. The samples will be stored in the freezer or extracted/analyzed immediately.

Each sample train consists of an adsorbent tube, Teflon fittings and tubing, rain/sun shield, rotameter (or needle valve), train support, and either a 12 volt DC or a 115 volt AC vacuum pump. Tubes are prepared for use by breaking off the sealed glass ends and immediately inserting the tube into the Teflon fitting. The tubes are oriented in the sample train according to a small arrow printed on the side indicating the direction of flow. A needle valve with a range of 0-5 slpm is used to control sample flow rate. The flow rates will be set using a calibrated digital mass flow meter (MFM), scaled from 0-5 slpm, before the start of each sampling period. The flow rate is also checked and recorded, using the MFM, at the end of each sampling period. Samplers will be leak checked prior to each sampling period, with the sampling tubes installed. Any change in flow rates will be recorded on the field log sheet. The pesticide sampling procedures for adsorbent tubes are included as Attachment IV (ambient) and V (application).

Ambient Monitoring

The DPR recommendations for acephate and methamidophos request that ambient monitoring occur in Fresno County for 7 consecutive weeks between July 8 and August 23, 2002. Four sampling sites will be selected in relatively high-population areas or in areas frequented by people (e.g., schools or school district offices, fire stations, or other public buildings). At each site, 28 discrete 24-hour samples will be collected, Monday through Friday (4 samples/week), during the 7-week sampling period. Background samples will be collected at the ARB air monitoring site in Fresno. Collocated (replicate) samples will be collected for six days (each Wednesday) at each sampling location.

The sites will be selected by ARB personnel based on the historical use of acephate and methamidophos in Fresno County. Sites will be selected for their proximity to these areas with considerations for both accessibility and security of the sampling equipment. ARB understands that DPR staff will verify and quantify the actual use of chlorothalonil that takes place during the study when the information becomes available.

Application Monitoring

The use patterns for acephate and methamidophos suggest that application-site monitoring may be conducted in Fresno County sometime during the ambient study, and that the monitoring be associated with an application of each compound at the highest use rate of approximately 1.0 pounds active ingredient (AI) per acre. As methamidophos is a breakdown product of acephate, both acephate and methamidophos will be monitored during the acephate application study. A separate study for methamidophos only will also be conducted.

The exact application monitoring schedules will vary based on the type and length of

application but will follow the schedule guidelines outlined below in Table 1. Ideally, each monitoring study will include samples taken before, during, and for approximately 72 hours following application.

TABLE 1. GUIDELINES FOR APPLICATION SAMPLING SCHEDULE

Sample period begins:	**Sample duration time**
Background (pre-application)	24 hours
During application	Length of application time
End of application	1 hour (or up to 1 hour before sunset)[1]
1 hour post-application	2 hours (or up to 1 hour before sunset)[1]
3 hour post-application	3 hours (or up to 1 hour before sunset)[1]
6 hour post-application	6 hours (or up to 1 hour before sunset)[1]
1 hour before sunset	Overnight[2] (until 1 hour after sunrise)
1 hour after sunrise	Daytime (until 1 hour before sunset)
1 hour before sunset	Overnight (until 1 hour after sunrise)
1 hour after sunrise	24-hour (until 1 hour after sunrise)

[1] These sample duration times will be adjusted depending on length of application and time of sunset.
[2] All overnight samples must include the period from one hour before sunset to one hour after sunrise. If the application extends beyond "1 hour before sunset" then the overnight sample will be started at the end of application.

Occasionally, a pesticide application may occur over the course of two or more days. In these instances, samples are collected during the first daily application followed by a sample from the end of application to 1 hour before sunset (if applicable). An overnight sample is then collected which will end at either the start of application or 1 hour after sunrise the next morning, whichever is first (same for third or more application days). If the day-2 application does not start on or before '1 hour after sunrise' and the expected time between '1 hour after sunrise' and the start of application is more than 2 hours, then an additional sample will be collected during this period. Following the end of the final application, samples are collected according to the above schedule, starting with the 1-hour sample. As stated above, if the application extends beyond "1 hour before sunset" then the overnight sample will be started at the end of application (i.e., no 1, 2, or 3 hour samples will be collected post application in this case).

A minimum of eight samplers will be positioned, one on each side of the field and one in each corner. A ninth sampler will be collocated at one position (downwind). Background (before application) samples should be collected for 24 hours. Ideally, samplers should be placed at 20 meters from the field. Conditions at the site will dictate the actual placement of monitoring stations.

The exact location of the application monitoring studies have not yet been determined. ARB

staff will contact the County Agricultural Commissioner's offices in the Fresno County area to coordinate the selection of study sites and the test dates. The County Agricultural Commissioner's staff will make initial contact with, or will at least provide a list of local contacts for growers, applicators, and/or pesticide control advisers that may be willing to cooperate in conducting the study. Monitoring sites are arranged with the voluntary cooperation of growers and applicators. ARB staff will investigate contacts until a cooperative grower is found and an appropriate site is selected. Permission to conduct the study will be obtained from the application plot land-owner and owners of adjacent land where samplers will be positioned.

Candidate fields for application monitoring will be 10 acres or larger. The crop type or specific application method for the application study were not specified by the DPR. However, the DPR recommended that, "...monitoring should occur at a site using the highest allowed use rates (i.e., 1 pound AI per acre for acephate and methamidophos...)".

ARB will provide the following information in the monitoring report:

1) An accurate record of the positions of the monitoring equipment with respect to the field, including the exact distance that the sampler is positioned from the field,
2) an accurate drawing of the monitoring site showing the precise location of the meteorological equipment, trees, buildings, etc.,
3) meteorological data collected at a minimum of 15 minute intervals including wind speed and direction, humidity, and comments regarding degree of cloud cover,
4) the elevation of each sampling station with respect to the field, and
5) the orientation of the field with respect to North (identified as either true or magnetic north).
6) The start and end time of the application each day.

III. Analysis

The draft "Standard Operating Procedure for the Sampling and Analysis of Methamidophos and Acephate in Ambient and Application Air Monitoring using Gas Chromatography with a Nitrogen-Phosphorous Detector and a Flame Photometric Detector" (June 6, 2002, draft version) is included as Attachment II. The results of method validation studies are included as Attachment III. The procedures consist of extraction of the exposed XAD-2 resin with an organic solvent followed by GC analysis. The DPR requested target 24-hour estimated quantitation limits (EQL) of 5.0 ng/m^3 and 1.0 ng/m^3 for acephate and methamidophos for the ambient study and target EQLs of 100 ng/m^3 and 50 ng/m^3 for acephate and methamidophos for the application studies. The EQLs actually achieved by the method were 17.3 ng/m^3 and 6.12 ng/m^3 for acephate and methamidophos respectively.

07

IV. Quality Assurance

Field Quality Control for the ambient monitoring will include:

1) Four field spikes collected under the same environmental and experimental conditions as those occurring at the time of ambient sampling. The field spikes will be obtained by sampling ambient air at the urban background monitoring site (ARB Fresno site) for 24-hour periods at 3.0 slpm (i.e., collocated with an ambient sample). One field spike each will be collected during weeks 1, 3, 4 and 6.

2) Four trip spikes prepared at the same level as the field spikes.

3) Four lab spikes prepared at the same level as the field and trip spikes.

4) Collocated (replicate) samples will be taken for six days (each Wednesday) at each sampling location.

5) A trip blank will be obtained each week of sampling.

Field Quality Control for the application monitoring will include:

1) Four field spikes collected under the same environmental and experimental conditions as those occurring at the time of ambient sampling. The field spikes will be obtained by sampling ambient air during background monitoring at the application site for the same duration as the background samples at 3.0 slpm (i.e., collocated with background samples).

2) Four trip spikes prepared at the same level as the field spikes.

3) Four lab spikes prepared at the same level as the field and trip spikes.

4) Collocated (replicate) samples will be taken for all samples at one of the sampling locations (downwind).

5) One trip blank will be obtained during the study.

A chain of custody sheet will accompany all samples. Mass flow meters will be calibrated by the ARB Standards Laboratory. The flow rate of each sampler will be audited by the ARB Quality Assurance Section prior to the monitoring studies.

V. Sample Labeling

Samples for the application study will be labeled using the following format:

Location-Chemical-Sampling Period-Type of Sample

Where:
Location is designated as north 1, 2 or 3 (N1, N2, N3), west (W), south 1, 2 or 3 (S1, S2, S3), and east (E). These designations can be revised as necessary depending on the configuration of the field.

Acephate is designated as A; Methamidophos is designated as M.

Sampling period is designated as B (for background) or 1 through 9 (# of periods can vary).

The type of sample is designated as S (sample), CO (collocated), TB (trip blank), TS (trip spike), and FS (field spike).

Examples:	S2-A-B-S	(South2, Acephate, background, sample)
	S2-A-B-FS	(South2, Acephate, background, field spike)
	S2-A-1-S	(South2, Acephate, sampling period 1, sample)
	S2-A-1-CO	(South2, Acephate, sampling period 1,collocated)

Samples for the ambient study will be labeled using the following format:

Location-Chemical-Sampling Period-Type of Sample

Where:
Location is designated by 3-letters. The designations will be defined after the sites have been chosen.

Acephate/Methamidophos is designated as AM.

Sampling period is designated as 1 through 28 (e.g., 24 periods in 6 weeks).

The type of sample is designated as S (sample), CO (collocated), TB (trip blank), TS (trip spike), and FS (field spike).

Example: ARB-AM-1-S (ARB Fresno site, Acephate/Metham., period 1, sample)
ARB-AM-1-CO (ARB Fresno site, Aceph/Metham., period 1, colloc.)

VI. Personnel

ARB personnel involved with coordinating and conducting the field activities will consist

of staff of the Air Quality Surveillance Branch, ARB.

VII. Safety Recommendations

The DPR's "Use Information and Air Monitoring Recommendations for the Pesticide Active Ingredients Acephate, Chlorothalonil, and Methamidophos" (February 21, 2002 memo, Sanders to Cook) include the following safety recommendations.

Acephate:

"The acephate product labels warn that acephate may be harmful if swallowed and cause eye irritation. Applicators should avoid breathing dust or spray mist and wash hands thoroughly after handling. Children and pets should not come into treated areas until the sprays have dried."

"According to the product labels, proper protective equipment (PPE) for applicators, handlers, mixers, and loaders include long-sleeve shirt and long pants, waterproof gloves, footwear plus socks, and chemical resistant headgear (for overhead exposure). PPE is also required for early entry (restricted-entry interval of 24 hours) to treated areas where contact may occur with anything that has been treated. Monitoring personnel should prevent exposure to the spray mist and treated plants, soil, or water and should refer to the label of the actual product used for further precautions."

Methamidophos:

"The methamidophos product labels warn that methamidophos is hazardous to humans and domestic animals. It is fatal if swallowed, inhaled, or absorbed through the skin. The label warns not to breathe vapor or mist and that the product is rapidly absorbed through the skin."

"Monitoring personnel should use proper protective equipment to prevent exposure to the vapors or spray mist and refer to the label of the actual product used for further precautions. According to the product labels, PPE for applicators and other handlers include coveralls over short sleeve shirt and short pants, chemical resistant gloves $\geq$ 14 mils, chemical resistant footwear plus socks, protective eyewear, chemical resistant headgear (for overhead exposure), a chemical resistant apron when cleaning, mixing, or loading, and a respirator with an organic-vapor removing cartridge with a pre-filter for pesticides or a canister approved for pesticides or a NIOSH approved respirator with an organic vapor cartridge with any N, R, P, or HE pre-filter. The restricted-entry interval (REI) is 48 hours, the REI is increased to 72 hours in outdoor areas where rainfall is less than 25 inches per year."

Attachment III

Method Validation Results

Air Resources Board

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Winston H. Hickox
Agency Secretary

Gray Davis
Governor

MEMORANDUM

TO: Webster Tasat, Manager
Operations Planning and Assessment Section

FROM: Russell Grace, Manager //s//
Special Analysis Section

DATE: October 30, 2002

SUBJECT: METHOD VALIDATION DATA FOR ANALYSIS OF METHAMIDOPHOS AND ACEPHATE

The Special Analysis Section provides laboratory support for the pesticide air monitoring program implemented by the ARB at the request of the Department of Pesticide Regulation. One of the responsibilities of the SAS is laboratory analytical method development. By way of this memo, we are providing you with the method validation data generated in the development of the methamidophos and acephate analytical method for the 2002 monitoring season. The attached tables contain the currently available data generated to determine the method detection limit (MDL), estimated quantitation limit (EQL), reproducibility, collection and extraction efficiency, storage stability and breakthrough.

All of the method development procedures were summarized in the draft standard operating procedure (SOP) for methamidophos and acephate. This draft SOP was previously provided to you.

If you have any questions, please contact T.E. Houston, Ph.D., at 322-2365 or me at 322-0223.

Attachment
cc: Michael Poore
T.E. Houston
Jim Omand
Michael Orbanosky
Kevin Mongar

TABLE 1
METHOD DETECTION LIMIT
Methamidophos and Acephate 2002

Date:07/02/02 XAD spikes Sample	**Methamidophos** (spike: 5 ng/ml) Amount Quantitated	**Acephate** (spike: 15 ng/ml) Amount Quantitated
1	5.040	25.530
2	4.840	26.080
3	5.030	24.590
4	4.310	23.760
5	4.080	23.400
6	5.060	23.820
7	4.620	25.230
Average	4.711	24.630
Standard Deviation (sd)	0.391	1.017
MDL=3.14*sd	1.227	3.192
EQL=5*MDL	6.133	15.960

TABLE 2
INSTRUMENT REPRODUCIBILITY

Methamidophos		Acephate	
Standard	**Amount: ng/ml**	**Standard**	**Amount: ng/ml**
5 ng/ml	5.83	15 ng/ml	17.69
	5.40		16.94
	5.80		17.10
	5.36		15.96
	5.32		15.21
Average	5.54	Average	16.58
Standard Dev.	0.25	Standard Dev.	0.99
40 ng/ml	36.3	80 ng/ml	68.4
	37.4		74.1
	37.8		72.9
	36.9		71.8
	36.4		69.2
Average	37.0	Average	71.3
Standard Dev.	0.64	Standard Dev.	2.42
100 ng/ml	96.8	150 ng/ml	146.9
	97.9		152.8
	94.8		146.1
	95.4		143.5
	98.6		146.3
Average	96.7	Average	147.1
Standard Dev.	1.61	Standard Dev.	3.43

TABLE 3
COLLECTION AND EXTRACTION EFFICIENCY

	Methamidophos	Acephate
Low spikes:	5 ng/ml	15 ng/ml
	116.5 % +/- 12.4	193.0 % +/- 29.6
High spikes:	70 ng/ml	100 ng/ml
	46.4 % +/- 2.1	110.9 % +/- 7.4

TABLE 4
STORAGE STABILITY STUDY

Day	% Recovery Methamidophos low	high	% Recovery Acephate low	high
0	86.6+/- 8.7	98.3 +/- 1.0	148.2 +/- 16	111.5 +/- 1.0
8	133.1 +/- 11	89.4 +/- 2.9	148.0 +/-11.7	118.3 +/- 2.7
14	105.0 +/- 21.9	76.5 +/- 10.6	146.4 +/- 10.3	80.7 +/- 8.0
21	95.2 +/- 7.3	94.1 +/- 3.2	153.2 +/- 5.5	126.5 +/- 7.7

TABLE 5
BREAKTHROUGH STUDY

Date: 09/27/02 XAD-2 Spike (500 ng/ml) Run at 3LPM for 24 hrs	Methamidophos		Acephate	
	ng/ml	% recovery	ng/ml	% recovery
XAD Blank	<MDL		<MDL	
XAD Lab Spike	485.2	97.04	559.3	111.86
Field Spike	441.85	88.37	744.7	148.94
Front Bed	391.6	78.32	675.7	135.14
	330	66.0	753.5	150.70
Average	387.82	77.56	724.63	144.93
Standard Deviation	56.02	11.20	42.61	8.52
Back Bed	<MDL		<MDL	

Attachment IV

Pesticide Sampling Procedures for Adsorbent Tubes
For Ambient Monitoring Studies

Pesticide Ambient Sampling Procedures
For Adsorbent Tubes

Overview:

-Collect samples over the six week sampling period; 24 hour samples; Four sampling periods per week per site; Five sampling sites plus an urban background site (ARB Fresno station).

-Collect a collocated sample from each site each Wednesday,

-Submit 1 trip blank per week,

-With the trip blank there normally will be 31 samples collected per week,

-4 field spikes will be run at the ARB site (time collocated exactly with the ambient sample. The field spikes will be distributed over the monitoring period (e.g., 1 per week on weeks 1, 3, 4, and 6). A trip spike will also accompany each field spike. These field and trip spikes will be logged in and shipped along with the regular samples. The field and trip spikes will be kept on dry ice during transport to and storage in the field.

-All samples are stored either in an ice-chest on dry ice or in a freezer,

-The field log sheet is filled out as the sampling is conducted. The originals stay in the field binder. Please include a copy with sample shipments. All QA samples must be logged onto the log sheet,

-The chain of custody (COC) forms are filled out prior to sample shipment; the originals are shipped with the samples; make and retain copies if desired (not necessary),

-(Disregard if samples are driven back to Sacramento) The samples are shipped by UPS, next day delivery, to 13th and T. This is normally done each Monday. The original chain of custody sheets must accompany the samples. The samples are shipped on 5 pounds of dry ice. Review the COCs and log sheet to insure that all documentation is correct and that the appropriate QA samples have been included.

Sampling Procedure:

Materials that will be needed on the roof to conduct the sampling include:

- -Clip board with log sheets
- -pencils/pens
- -sample labels
- -sample cartridges
- -end caps
- -plastic test tubes
- -0 to 5 slpm mass flow meter (MFM) with battery

Figure out your route for sampling the six locations and try to keep this the same throughout

the study. In general, try to make each sampling period 24 hours; e.g., if start time is 11:10 then end time should be 11:10. (round off to the nearest 5 minutes.) The sample period may not always be exactly 24 hours; but that is the target time frame.

Preparation and Set-up

On the way to the first site, plug the MFMs into the batteries. It takes the MFMs about 10 minutes to warm up before they can be used. Leave the MFMs plugged in until the last sample for the day is taken; then unplug for the night to minimize drop in battery charge. Recharge the batteries once per week to be on the safe side.

Upon arrival at the site, check in if needed. Fill out the sample labels for that site. I suggest a backpack and/or fannypacks to carry the stuff to the roof.

Securely attach one adsorbent sample cartridge to the sampling tree. MAKE SURE THE ARROW ON THE CARTRIDGE IS POINTING TOWARDS THE SAMPLE LINE.

Perform the leak check on each sample line by placing a plastic tube cap over the inlet of the cartridge (with the pump on). The rotameter ball should fall to zero. The leak check should be performed before setting the flows with the MFMs.

Using the 5 slpm MFM set the flow rate exactly to 3.0 slpm.

Make sure that the rain/sun cover is pulled down over the sample tube.

Fill out the log sheet, including: log #, start date, time, start counter reading, leak check OK, any comments and the weather conditions.

Sample collection and Shipment

Measure (do not re-set) the flow rates at the end of the sampling period with the MFMs; leak check the sample lines; record the end data on the log sheet.

Remove the sample cartridge and cap the ends. Attach the sample label like a flag on the secondary end of the tube. Make sure that the label does not cover the glass wool separating the primary and secondary beds in the cartridge.

Place the cartridge in the plastic test tube shipping container.

Place all the samples for each day (6) in a zip-lock bag and place on dry ice in a cooler or in a freezer. While driving the route the collected samples need to be kept on dry ice.

Collect the collocated (duplicate) samples from each site every Wednesday. These should be started and stopped at the same times as the regular samples.

Collect a trip blank (TB) once per week,while at one of the field sites. It doesn't matter

which site (or which day) but note it in the comment section of the log sheet. The TB is collected by breaking the ends off of a tube, capping and labeling as usual and storing along with the rest of the samples. Log the TB into the log sheet.

APPENDIX II

Air Sampling Cartridge Method Development and Analytical Results
of Ambient Monitoring in Fresno County for Methamidophos and Acephate

California Environmental Protection Agency

Air Resources Board

Air Sampling Cartridge Method Development and Analytical Results of Ambient Monitoring in Fresno County for Methamidophos and Acephate.

DATE: October 27, 2003
Revision 1

Prepared by:
T. E. Houston, Ph.D.

Special Analysis Section
Northern Laboratory Branch
Monitoring and Laboratory Division

Reviewed and Approved by

Russell Grace, Manager
Special Analysis Section

Project Number: P02-003

Table of Contents

1.0 INTRODUCTION

The Department of Pesticide Regulation (DPR) requested the Air Resources Board (ARB) to conduct ambient air monitoring for methamidophos and acephate. This report covers the method development and analytical and quality assurance results for methamidophos and acephate during a seven (7) week period in Fresno County. DPR requested a method estimated quantitation limit (EQL) of one (1) nanogram per cubic meter (ng/m^3) for methamidophos and five (5) ng/m^3 for acephate. The EQL achieved during this project was 4.28 ng/m^3 for methamidophos and 11.1 ng/m^3 for acephate.

2.0 METHOD DEVELOPMENT

2.1 Overview

XAD-2 cartridges are used for ambient air sampling. Sample cartridges are stored at or below four (4) degrees centigrade (°C) before extraction. Sample cartridges are extracted with three (3) milliliters (ml) of 10% acetone in ethyl acetate (EA) and desorbed in an ultrasonic bath. Sample extracts are analyzed using a gas chromatograph with a flame photometric detector (GC/FPD). Sample analysis and quantitation used the internal standard diazinon, added to the extracts before GC/FPD analysis. Estimated quantitation levels for this method, based on 4.3 cubic meters (m^3) of air collected, and a final extract volume of three (3) ml, is 4.28 ng/m^3 for methamidophos and 11.1 ng/m^3 for acephate. Appendix A contains the standard operating procedure (SOP) for methamidophos and acephate.

2.2 Instrument Reproducibility

Five (5) individual injections of three (3) microliters (µl) each were made of methamidophos and acephate at three concentrations (low, medium, and high) in order to establish the reproducibility of the instrument. Table 1 shows the results for the three levels with the average and standard deviation for each level.

2.3 Calibration Curve

The standard concentrations for methamidophos were 5, 10, 20, 40, 60, and 100 ng/ml to produce a six (6) point calibration curve. The standard concentrations for acephate were 15, 30, 60, 80, 100, and 150 ng/ml for a six (6) point calibration curve. All calibration curves performed had a r^2 (variance) greater than or equal to 0.995. A calibration curve was run before each analytical sample batch. The analytical sample batch is the samples and the quality controls run for a given day.

2.4. Method Detection Limit (MDL)

The MDL calculation follows the United States Environmental Protection Agency (USEPA) procedures for calculating MDL's. Using the analysis of seven low-level matrix spikes, the MDL and EQL for a three (3) ml extract is calculated as follows:

s = the standard deviation of the concentration calculated for the seven replicate spikes.
For methamidophos: s = 0.391 ng/ml
MDL = (3.14) x (s) = (3.14) x (0.391) = 1.227 ng/ml.
EQL = (5) x (MDL) = (5) x (1.227) = 6.133 ng/ml
*EQL for total ng/sample = 18.40 ng/sample**

For acephate: s = 1.017 ng/ml
MDL = (3.14) x (s) = (3.14) x (1.017) = 3.192 ng/ml.
EQL = (5) x (MDL) = (5) x (3.192) = 15.960 ng/ml
*EQL for total ng/sample = 47.88 ng/sample**

** assuming a 3 ml final extract volume*

Based on a total collection volume of 4.3 m^3 the EQL would be 4.28 ng/m^3 for methamidophos and 11.1 ng/m^3 for acephate. Staff report results above the EQL to three (3) significant figures. Results below the EQL but greater than or equal to the MDL are reported as detected (DET). Results less than MDL are reported as <MDL.

2.5. Collection and Extraction Efficiency (Recovery)

Six (6) XAD-2 cartridges were used to determine method field recovery. The primary sections (front bed) of three (3) cartridges were spiked with methamidophos at 5.0 ng/ml and acephate at 15 ng/ml. The three (3) others were spiked with methamidophos at 70 ng/ml and acephate at 100 ng/ml. The spiked tubes were placed on field samplers and sampled at an airflow of approximately three (3) liters per minute (lpm) for 24 hours at ambient temperature. The XAD-2 was removed from the primary section of the XAD-2 cartridge and using three (3) ml of EA-10% acetone was desorbed using an ultrasonic bath. After extraction, internal standard was added to a 1 ml aliquot and the extract was analyzed by GC/FPD.

2.6. Storage Stability

Laboratory staff completed a storage stability study which ran for 21 days with cartridges being tested at 0, 8, 14, and 21 days. Methamidophos and acephate spiked on XAD-2 cartridges, were stable for up to 21 days when stored in a freezer at -20 ° C. All field samples were analyzed within 21 days of collection.

2.7. Breakthrough

Three (3) XAD-2 cartridges were spiked at 500 ng/ml of methamidophos and acephate to evaluate analyte breakthrough. Air was collected at approximately three (3) lpm for 24 hours. Methamidophos and acephate were not detected in the secondary section of the XAD-2 cartridges. Average recovery for methamidophos from the primary sections was 78 +/- 11%; recovery for acephate was 145 +/- 9%.

3.0 AMBIENT AIR MONITORING SAMPLE RESULTS.

The laboratory received a total of 231 ambient samples including seven (7) field spikes, seven (7) field blanks, and seven (7) trip spikes from July 8, 2002 to August 22, 2002. Table 2 presents the results of the analysis of the methamidophos and acephate ambient air samples by site.

4.0 ANALYTICAL QUALITY CONTROL SAMPLES

4.1 Solvent Blanks

Laboratory staff analyzed a solvent blank with each analytical batch, after each calibration check standard, after every tenth sample and after samples containing high levels of methamidophos or acephate or co-extracted contaminants. Staff defined the analytical batch as all the samples extracted together, but not to exceed twenty (20) samples. The solvent blank was run to ensure the solvent and instrument did not contribute interferences to the analysis, and to minimize carryover from high level samples. All solvent blanks were less than the MDL.

4.2 Method Blanks

Laboratory staff analyzed a method blank with each analytical batch. This was an XAD-2 cartridge prepared and analyzed as described for the ambient samples. Laboratory staff analyzed sixteen (16) method blanks during this project. All method blanks were less than the MDL.

4.3 Laboratory Control Samples (LCS)

Laboratory staff analyzed a LCS with each analytical batch for a total of sixteen (16). A LCS was an XAD-2 cartridge spiked at 70 ng/ml of methamidophos and 100 ng/ml of acephate. The LCS was extracted and analyzed as described for the samples. The LCS recoveries averaged as follows: 96.0% +/- 11.4% for methamidophos and 109.4% +/- 14.9% for acephate.

4.4 Calibration Check Standard (CCS)

Following standard lab procedures, laboratory staff analyzed a CCS after every calibration curve, after every tenth (10) sample and at the end of each analytical batch. The CCS must be within +/- 25% of the expected value. If any of the CCS's are outside this limit, the affected samples are re-analyzed after recalibration. The CCS for each analytical batch is 70 ng/ml for methamidophos and 100 ng/ml for acephate.

4.5 Laboratory Duplicates

No laboratory duplicates were run with this project.

5.0 FIELD, TRIP, AND LABORATORY SPIKES AND TRIP BLANKS

During the Fresno County project seven (7) sets of laboratory, trip, and field spikes along with seven (7) trip blanks were analyzed. Laboratory staff prepared one set of spikes at 70 ng/ml methamidophos and 100 ng/ml acephate, each week during the seven-week monitoring project.

5.1 Field Spikes

Table 3 presents the results of the field spikes. The spikes were placed on a sampler at the ARB ambient air monitoring station in Fresno and sampled as per field samples. The average recovery of the field spikes for methamidophos was 62.4% +/- 8.2%. The average recovery for acephate was 104.6% +/- 35.6%. The collocated ambient background samples were low and no corrections were made to the field spike recoveries.

5.2 Trip Spikes

Table 3 presents the results of the trip spikes. The average recovery for methamidophos was 90.8% +/- 3.7%. The average recovery for the acephate was 102.3% +/- 9.1%.

5.3 Laboratory Spikes

Table 3 presents the results of the laboratory spikes. The average methamidophos recovery was 90.4% +/- 6.8%. The average recovery of acephate was 103.3% +/- 17.1%.

5.4 Trip Blanks

Table 3 presents the results of the trip blanks. All seven (7) trip blanks received during this project had results less than the MDL.

6.0 DISCUSSION

During the project, 210 ambient samples were analyzed for methamidophos and acephate. The reported EQL for methamidophos is based on the low calibration standard of 15 ng/sample. The reported EQL for acephate is 45 ng/sample from the low calibration standard. Twelve (12) samples had methamidophos results greater than the EQL of 15 ng/sample. The concentrations ranged from 17.55 to 68.67 ng/sample. Seven (7) samples had results reported as detected. For acephate, only one (1) sample had a quantitation above the EQL of 45 ng/sample at 61.29 ng/sample. Six (6) samples had results reported as detected. Confirmation of the methamidophos and acephate in the samples is not possible with the current method.

Some anomalies were observed in the analysis of methamidophos and acephate. Acephate is very unstable after extraction and there is no explanation to account for the wide variability of recovery efficiencies. While the acephate is stable on the XAD based on the storage studies, once in solution, even at low temperatures it is not. The data from the laboratory and trip spikes indicate that the extraction method is acceptable. The higher percentage recovery of acephate indicates that some interaction may be occurring between the XAD resin and the target compound. Re-analysis of an extract within 24 hours results in acephate values up to 2 times higher than the original value. Due to interfering peaks on the nitrogen phosphorus detector, use of this detector for confirmation was not available. The 48% and 163% recoveries of the field spikes appear to be outliers compared to the remainder of the field spike recovery data. The field spike recoveries during the method development were acceptable, although "high" for the lower spiked samples. Since the samples were predominantly <MDL, the actual values may be lower based on the "high" recoveries of the field spikes. All the samples were analyzed the day of extraction and not kept in extract storage longer than a few hours.

While recoveries of methamidophos at the low end were good, the high end spikes averaged about 62%. Random analysis of the back bed of the cartridges did not detect any methamidophos.

All other project QC was acceptable and no other problems or anomalies were observed during this project.

Table 1: Instrument Reproducibility

Methamidophos		Acephate	
Standard	**Amount: ng/ml**	**Standard**	**Amount: ng/ml**
5 ng/ml	5.83	15 ng/ml	17.69
	5.40		16.94
	5.80		17.10
	5.36		15.96
	5.32		15.21
Average	5.54	Average	16.58
Standard Dev.	0.25	Standard Dev.	0.99
40 ng/ml	36.3	80 ng/ml	68.4
	37.4		74.1
	37.8		72.9
	36.9		71.8
	36.4		69.2
Average	36.7	Average	71.3
Standard Dev.	0.64	Standard Dev.	2.42
100 ng/ml	96.8	150 ng/ml	146.9
	97.9		152.8
	94.8		146.1
	95.4		143.5
	98.6		146.3
Average	96.7	Average	147.1
Standard Dev.	1.61	Standard Dev.	3.43

Table 2: Ambient Air Monitoring Results
Fresno County 2002

Site: Fresno APCD

Log Number	Sample Identification	Date Sampled	Date Analyzed	Methamidophos ng/sample	Acephate ng/sample
2	FRS-AM-1	7/8/02	7/15/02	<MDL	<MDL
8	FRS-AM-2	7/9/02	7/17/02	<MDL	<MDL
9	FRS-AM-2C	7/9/02	7/17/02	<MDL	<MDL
22	FRS-AM-3	7/10/02	7/19/02	<MDL	<MDL
28	FRS-AM-4	7/11/02	7/19/02	<MDL	<MDL
34	FRS-AM-5	7/15/02	7/22/02	<MDL	<MDL
43	FRS-AM-6	7/16/02	7/24/02	<MDL	<MDL
44	FRS-AM-6C	7/16/02	7/24/02	<MDL	<MDL
55	FRS-AM-7	7/17/02	7/26/02	<MDL	<MDL
61	FRS-AM-8	7/18/02	7/26/02	<MDL	<MDL
67	FRS-AM-9	7/22/02	7/29/02	DET	DET
76	FRS-AM-10	7/23/02	7/29/02	<MDL	<MDL
77	FRS-AM-10C	7/23/02	7/29/02	<MDL	<MDL
88	FRS-AM-11	7/24/02	7/31/02	<MDL	<MDL
94	FRS-AM-12	7/25/02	7/31/02	<MDL	<MDL
100	FRS-AM-13	7/29/02	8/6/02	<MDL	<MDL
109	FRS-AM-14	7/30/02	8/6/02	<MDL	<MDL
110	FRS-AM-14C	7/30/02	8/6/02	<MDL	<MDL
121	FRS-AM-15	7/31/02	8/7/02	<MDL	<MDL
127	FRS-AM-16	8/1/02	8/7/02	<MDL	<MDL
133	FRS-AM-17	8/5/02	8/13/02	<MDL	<MDL
142	FRS-AM-18	8/6/02	8/13/02	<MDL	<MDL
143	FRS-AM-18C	8/6/02	8/13/02	<MDL	<MDL
154	FRS-AM-19	8/7/02	8/15/02	<MDL	<MDL
160	FRS-AM-20	8/8/02	8/15/02	<MDL	<MDL
166	FRS-AM-21	8/12/02	8/19/02	<MDL	<MDL
175	FRS-AM-22	8/13/02	8/19/02	<MDL	<MDL
176	FRS-AM-22C	8/13/02	8/19/02	<MDL	<MDL
187	FRS-AM-23	8/14/02	8/21/02	<MDL	<MDL
193	FRS-AM-24	8/15/02	8/21/02	<MDL	<MDL
200	FRS-AM-25	8/19/02	8/27/02	DET	DET
208	FRS-AM-26	8/20/02	8/27/02	<MDL	<MDL
209	FRS-AM-26C	8/20/02	8/27/02	<MDL	<MDL
220	FRS-AM-27	8/21/02	8/29/02	<MDL	<MDL
226	FRS-AM-28	8/22/02	8/29/02	<MDL	<MDL

Table 2: Ambient Air Monitoring Results
Fresno County 2002

Site: Helm Elementary School

Log Number	Sample Identification	Date Sampled	Date Analyzed	Methamidophos ng/sample	Acephate ng/sample
3	HES-AM-1	7/8/02	7/15/02	<MDL	<MDL
12	HES-AM-2	7/9/02	7/17/02	<MDL	<MDL
13	HES-AM-2C	7/9/02	7/17/02	<MDL	<MDL
23	HES-AM-3	7/10/02	7/19/02	<MDL	<MDL
29	HES-AM-4	7/11/02	7/19/02	<MDL	<MDL
38	HES-AM-5	7/15/02	7/22/02	<MDL	<MDL
45	HES-AM-6	7/16/02	7/24/02	<MDL	<MDL
46	HES-AM-6C	7/16/02	7/24/02	<MDL	<MDL
56	HES-AM-7	7/17/02	7/26/02	<MDL	<MDL
62	HES-AM-8	7/18/02	7/26/02	<MDL	<MDL
69	HES-AM-9	7/22/02	7/29/02	<MDL	<MDL
78	HES-AM-10	7/23/02	7/29/02	<MDL	<MDL
79	HES-AM-10C	7/23/02	7/29/02	<MDL	<MDL
89	HES-AM-11	7/24/02	7/31/02	<MDL	<MDL
95	HES-AM-12	7/25/02	7/31/02	<MDL	<MDL
104	HES-AM-13	7/29/02	8/6/02	24.3	<MDL
111	HES-AM-14	7/30/02	8/6/02	22.0	<MDL
112	HES-AM-14C	7/30/02	8/6/02	22.9	<MDL
122	HES-AM-15	7/31/02	8/7/02	23.2	<MDL
128	HES-AM-16	8/1/02	8/7/02	29.0	<MDL
135	HES-AM-17	8/5/02	8/13/02	<MDL	<MDL
142	FRS-AM-18	8/6/02	8/13/02	<MDL	<MDL
143	FRS-AM-18C	8/6/02	8/13/02	<MDL	<MDL
155	HES-AM-19	8/7/02	8/15/02	<MDL	<MDL
161	HES-AM-20	8/8/02	8/15/02	<MDL	<MDL
170	HES-AM-21	8/12/02	8/19/02	<MDL	<MDL
177	HES-AM-22	8/13/02	8/19/02	<MDL	<MDL
178	HES-AM-22C	8/13/02	8/19/02	<MDL	<MDL
188	HES-AM-23	8/14/02	8/21/02	<MDL	<MDL
194	HES-AM-24	8/15/02	8/21/02	<MDL	<MDL
203	HES-AM-25	8/19/02	8/27/02	<MDL	<MDL
210	HES-AM-26	8/20/02	8/27/02	<MDL	<MDL
211	HES-AM-26C	8/20/02	8/27/02	<MDL	<MDL
221	HES-AM-27	8/21/02	8/29/02	<MDL	<MDL
227	HES-AM-28	8/22/02	8/29/02	<MDL	<MDL

Table 2: Ambient Air Monitoring Results
Fresno County 2002

Site: San Joaquin Elementary School

Log Number	Sample Identification	Date Sampled	Date Analyzed	Methamidophos ng/sample	Acephate ng/sample
4	SJS-AM-1	7/8/02	7/15/02	<MDL	<MDL
14	SJS-AM-2	7/9/02	7/17/02	<MDL	<MDL
15	SJS-AM-2C	7/9/02	7/17/02	<MDL	<MDL
24	SJS-AM-3	7/10/02	7/19/02	<MDL	<MDL
30	SJS-AM-4	7/11/02	7/19/02	<MDL	<MDL
39	SJS-AM-5	7/15/02	7/22/02	<MDL	<MDL
47	SJS-AM-6	7/16/02	7/24/02	<MDL	<MDL
48	SJS-AM-6C	7/16/02	7/24/02	<MDL	<MDL
57	SJS-AM-7	7/17/02	7/26/02	<MDL	<MDL
63	SJS-AM-8	7/18/02	7/26/02	<MDL	<MDL
70	SJS-AM-9	7/22/02	7/29/02	<MDL	<MDL
80	SJS-AM-10	7/23/02	7/29/02	<MDL	<MDL
81	SJS-AM-10C	7/23/02	7/29/02	<MDL	<MDL
90	SJS-AM-11	7/24/02	7/31/02	<MDL	<MDL
96	SJS-AM-12	7/25/02	7/31/02	<MDL	<MDL
105	SJS-AM-13	7/29/02	8/6/02	<MDL	<MDL
113	SJS-AM-14	7/30/02	8/6/02	17.6	<MDL
114	SJS-AM-14C	7/30/02	8/6/02	20.6	<MDL
123	SJS-AM-15	7/31/02	8/7/02	68.7	<MDL
129	SJS-AM-16	8/1/02	8/7/02	23.8	<MDL
136	SJS-AM-17	8/5/02	8/13/02	<MDL	<MDL
146	SJS-AM-18	8/6/02	8/13/02	DET	<MDL
147	SJS-AM-18C	8/6/02	8/13/02	DET	<MDL
156	SJS-AM-19	8/7/02	8/15/02	<MDL	<MDL
162	SJS-AM-20	8/8/02	8/15/02	<MDL	<MDL
171	SJS-AM-21	8/12/02	8/19/02	<MDL	<MDL
179	SJS-AM-22	8/13/02	8/19/02	<MDL	<MDL
180	SJS-AM-22C	8/13/02	8/19/02	<MDL	<MDL
189	SJS-AM-23	8/14/02	8/21/02	<MDL	<MDL
195	SJS-AM-24	8/15/02	8/21/02	<MDL	<MDL
204	SJS-AM-25	8/19/02	8/27/02	<MDL	<MDL
212	SJS-AM-26	8/20/02	8/27/02	<MDL	<MDL
213	SJS-AM-26C	8/20/02	8/27/02	<MDL	<MDL
222	SJS-AM-27	8/21/02	8/29/02	<MDL	<MDL
228	SJS-AM-28	8/22/02	8/29/02	<MDL	<MDL

Table 2: Ambient Air Monitoring Results
Fresno County 2002

Site: Tranquility High School

Log Number	Sample Identification	Date Sampled	Date Analyzed	Methamidophos ng/sample	Acephate ng/sample
5	THS-AM-1	7/8/02	7/15/02	<MDL	<MDL
16	THS-AM-2	7/9/02	7/17/02	<MDL	<MDL
17	THS-AM-2C	7/9/02	7/17/02	<MDL	<MDL
25	THS-AM-3	7/10/02	7/19/02	<MDL	<MDL
31	THS-AM-4	7/11/02	7/19/02	<MDL	<MDL
40	THS-AM-5	7/15/02	7/22/02	<MDL	<MDL
49	THS-AM-6	7/16/02	7/24/02	<MDL	<MDL
50	THS-AM-6C	7/16/02	7/24/02	<MDL	<MDL
58	THS-AM-7	7/17/02	7/26/02	<MDL	<MDL
64	THS-AM-8	7/18/02	7/26/02	<MDL	<MDL
71	THS-AM-9	7/22/02	7/29/02	<MDL	<MDL
82	THS-AM-10	7/23/02	7/29/02	<MDL	<MDL
83	THS-AM-10C	7/23/02	7/29/02	<MDL	<MDL
91	THS-AM-11	7/24/02	7/31/02	<MDL	<MDL
97	THS-AM-12	7/25/02	7/31/02	<MDL	<MDL
106	THS-AM-13	7/29/02	8/6/02	<MDL	<MDL
115	THS-AM-14	7/30/02	8/6/02	<MDL	<MDL
116	THS-AM-14C	7/30/02	8/6/02	<MDL	<MDL
124	THS-AM-15	7/31/02	8/7/02	27.8	<MDL
130	THS-AM-16	8/1/02	8/7/02	DET	<MDL
137	THS-AM-17	8/5/02	8/13/02	<MDL	<MDL
148	THS-AM-18	8/6/02	8/13/02	<MDL	<MDL
149	THS-AM-18C	8/6/02	8/13/02	<MDL	<MDL
157	THS-AM-19	8/7/02	8/15/02	<MDL	<MDL
163	THS-AM-20	8/8/02	8/15/02	<MDL	<MDL
172	THS-AM-21	8/12/02	8/19/02	<MDL	<MDL
181	THS-AM-22	8/13/02	8/19/02	<MDL	<MDL
182	THS-AM-22C	8/13/02	8/19/02	<MDL	<MDL
190	THS-AM-23	8/14/02	8/21/02	<MDL	<MDL
196	THS-AM-24	8/15/02	8/21/02	<MDL	<MDL
205	THS-AM-25	8/19/02	8/27/02	<MDL	<MDL
214	THS-AM-26	8/20/02	8/27/02	<MDL	<MDL
215	THS-AM-26C	8/20/02	8/27/02	DET	61.3
223	THS-AM-27	8/21/02	8/29/02	<MDL	<MDL
229	THS-AM-28	8/22/02	8/29/02	<MDL	<MDL

Table 2: Ambient Air Monitoring Results
Fresno County 2002

Site: Cantua Creek Elementary School

Log Number	Sample Identification	Date Sampled	Date Analyzed	Methamidophos ng/sample	Acephate ng/sample
6	CES-AM-1	7/8/02	7/15/02	<MDL	<MDL
18	CES-AM-2	7/9/02	7/17/02	<MDL	<MDL
19	CES-AM-2C	7/9/02	7/17/02	<MDL	<MDL
26	CES-AM-3	7/10/02	7/19/02	<MDL	<MDL
32	CES-AM-4	7/11/02	7/19/02	<MDL	<MDL
41	CES-AM-5	7/15/02	7/22/02	<MDL	<MDL
51	CES-AM-6	7/16/02	7/24/02	<MDL	<MDL
52	CES-AM-6C	7/16/02	7/24/02	<MDL	<MDL
59	CES-AM-7	7/17/02	7/26/02	<MDL	<MDL
65	CES-AM-8	7/18/02	7/26/02	<MDL	<MDL
72	CES-AM-9	7/22/02	7/29/02	<MDL	<MDL
84	CES-AM-10	7/23/02	7/29/02	<MDL	<MDL
85	CES-AM-10C	7/23/02	7/29/02	<MDL	<MDL
92	CES-AM-11	7/24/02	7/31/02	<MDL	<MDL
98	CES-AM-12	7/25/02	7/31/02	<MDL	<MDL
107	CES-AM-13	7/29/02	8/6/02	<MDL	<MDL
117	CES-AM-14	7/30/02	8/6/02	<MDL	<MDL
118	CES-AM-14C	7/30/02	8/6/02	<MDL	<MDL
125	CES-AM-15	7/31/02	8/7/02	<MDL	<MDL
131	CES-AM-16	8/1/02	8/7/02	22.7	<MDL
138	CES-AM-17	8/5/02	8/13/02	<MDL	<MDL
150	CES-AM-18	8/6/02	8/13/02	<MDL	<MDL
151	CES-AM-18C	8/6/02	8/13/02	<MDL	<MDL
158	CES-AM-19	8/7/02	8/15/02	<MDL	<MDL
164	CES-AM-20	8/8/02	8/15/02	<MDL	<MDL
173	CES-AM-21	8/12/02	8/19/02	<MDL	<MDL
183	CES-AM-22	8/13/02	8/19/02	<MDL	<MDL
184	CES-AM-22C	8/13/02	8/19/02	<MDL	<MDL
191	CES-AM-23	8/14/02	8/21/02	<MDL	<MDL
197	CES-AM-24	8/15/02	8/21/02	<MDL	<MDL
206	CES-AM-25	8/19/02	8/27/02	<MDL	<MDL
216	CES-AM-26	8/20/02	8/27/02	DET	DET
217	CES-AM-26C	8/20/02	8/27/02	<MDL	DET
224	CES-AM-27	8/21/02	8/29/02	<MDL	<MDL
230	CES-AM-28	8/22/02	8/29/02	<MDL	<MDL

Table 2: Ambient Air Monitoring Results
Fresno County 2002

Site: Westside Research and Extension

Log Number	Sample Identification	Date Sampled	Date Analyzed	Methamidophos ng/sample	Acephate ng/sample
7	WRS-AM-1	7/8/02	7/15/02	<MDL	<MDL
20	WRS-AM-2	7/9/02	7/17/02	<MDL	<MDL
21	WRS-AM-2C	7/9/02	7/17/02	<MDL	<MDL
27	WRS-AM-3	7/10/02	7/19/02	<MDL	<MDL
33	WRS-AM-4	7/11/02	7/19/02	<MDL	<MDL
42	WRS-AM-5	7/15/02	7/22/02	<MDL	<MDL
53	WRS-AM-6	7/16/02	7/24/02	<MDL	<MDL
54	WRS-AM-6C	7/16/02	7/24/02	<MDL	<MDL
60	WRS-AM-7	7/17/02	7/26/02	<MDL	<MDL
66	WRS-AM-8	7/18/02	7/26/02	<MDL	<MDL
73	WRS-AM-9	7/22/02	7/29/02	<MDL	<MDL
86	WRS-AM-10	7/23/02	7/29/02	<MDL	<MDL
87	WRS-AM-10C	7/23/02	7/29/02	<MDL	<MDL
93	WRS-AM-11	7/24/02	7/31/02	<MDL	<MDL
99	WRS-AM-12	7/25/02	7/31/02	<MDL	<MDL
108	WRS-AM-13	7/29/02	8/6/02	<MDL	<MDL
119	WRS-AM-14	7/30/02	8/6/02	<MDL	<MDL
120	WRS-AM-14C	7/30/02	8/6/02	<MDL	<MDL
126	WRS-AM-15	7/31/02	8/7/02	<MDL	<MDL
132	WRS-AM-16	8/1/02	8/7/02	<MDL	<MDL
139	WRS-AM-17	8/5/02	8/13/02	<MDL	<MDL
152	WRS-AM-18	8/6/02	8/13/02	<MDL	<MDL
153	WRS-AM-18C	8/6/02	8/13/02	<MDL	<MDL
159	WRS-AM-19	8/7/02	8/15/02	<MDL	<MDL
165	WRS-AM-20	8/8/02	8/15/02	26.8	<MDL
174	WRS-AM-21	8/12/02	8/19/02	<MDL	<MDL
185	WRS-AM-22	8/13/02	8/19/02	<MDL	DET
186	WRS-AM-22C	8/13/02	8/19/02	<MDL	DET
192	WRS-AM-23	8/14/02	8/21/02	<MDL	<MDL
198	WRS-AM-24	8/15/02	8/21/02	<MDL	<MDL
207	WRS-AM-25	8/19/02	8/27/02	<MDL	<MDL
218	WRS-AM-26	8/20/02	8/27/02	<MDL	<MDL
219	WRS-AM-26C	8/20/02	8/27/02	<MDL	<MDL
225	WRS-AM-27	8/21/02	8/29/02	<MDL	<MDL
231	WRS-AM-28	8/22/02	8/29/02	<MDL	<MDL

Table 2 Notes: Ambient Monitoring Results, Fresno County 2002

The EQL and MDL reported are based on the lowest calibration standard.
<MDL = methamidophos: 3.0 ng/sample and acephate: 9 ng/sample
EQL = methamidophos: 15 ng/sample and acephate: 45 ng/sample

If analytical result is ≥ MDL and < EQL it is reported in the table as detected (DET). Levels at or above the EQL are reported as the actual measured value and are reported to three significant figures.

Sample ID (Sample identification) numbers ending with the letter C (for example: FRS-AM-2C) are collocated samples for the samples with the corresponding number.

Site location identification:

FRS:	Fresno APCD monitoring site
HES:	Helm Elementary School
SJS:	San Joaquin Elementary School
THS:	Tranquility High School
CES:	Cantua Creek Elementary School
WRS:	Westside Research and Extension

Table 3: XAD-2 Field, Trip, and Laboratory Spikes and Trip Blank Results

Field Spikes		Methamidophos		Acephate	
Date	Sample Identification	Amount (ng/ml)	%Recovery	Amount (ng/ml)	%Recovery
15-Jul	FRSAM1FS#1	39.00	55.71	85.73	85.73
23-Jul	FRSAM5FS#35	40.78	58.26	48.05	48.05
29-Jul	FRSAM9FS#68	40.24	57.49	92.24	92.24
6-Aug	FRSAM13FS#101	41.59	59.41	110.8	110.8
13-Aug	FRSAM17FS#134	50.59	72.27	106.4	106.4
19-Aug	FRSAM21FS#167	40.56	57.94	125.7	125.7
27-Aug	FRSAM25FS#201	53.25	76.07	163.1	163.1

Trip Spikes		Methamidophos		Acephate	
Date	Sample Identification	Amount (ng/ml)	%Recovery	Amount (ng/ml)	%Recovery
15-Jul	FRSAM2TS#10	60.27	86.10	105.4	105.4
23-Jul	FRSAM5TS#36	65.12	93.03	92.92	92.92
29-Jul	FRSAM9TS#74	66.02	94.31	99.55	99.55
6-Aug	FRSAM13TS#102	60.70	86.71	92.78	92.78
13-Aug	FRSAM17TS#141	62.83	89.76	98.34	98.34
19-Aug	FRSAM21TS#168	62.83	89.76	109.5	109.5
27-Aug	FRSAM25TS#199	66.99	95.70	117.7	117.7

Laboratory Spikes		Methamidophos		Acephate	
Date	Sample Identification	Amount (ng/ml)	%Recovery	Amount (ng/ml)	%Recovery
15-Jul	Laboratory spike#1	56.2	80.29	85	85.00
23-Jul	Laboratory spike#2	65.35	93.36	100.5	100.5
29-Jul	Laboratory spike#3	63.93	91.33	109.4	109.4
6-Aug	Laboratory spike#4	56.8	81.14	100.4	100.4
13-Aug	Laboratory spike#5	66.4	94.86	80.75	80.75
19-Aug	Laboratory spike#6	67.52	96.46	128.1	128.1
27-Aug	Laboratory spike#7	66.86	95.51	119.0	119.0

Trip Blank			
Date	Sample Identification	Methamidophos	Acephate
15-Jul	FRSAM2TB#11	<MDL	<MDL
23-Jul	FRSAM5TB#37	<MDL	<MDL
29-Jul	FRSAM9TB#75	<MDL	<MDL
6-Aug	FRSAM13TB#103	<MDL	<MDL
13-Aug	FRSAM17TB#140	<MDL	<MDL
19-Aug	FRSAM21TB#169	<MDL	<MDL
27-Aug	FRSAM25TB#202	<MDL	<MDL

Appendix A:

Standard Operating Procedure for Methamidophos and Acephate

California Environmental Protection Agency

Air Resources Board

Standard Operating Procedure for the Sampling and Analysis of Methamidophos and Acephate in Ambient and Applicaton Air Monitoring using Gas Chromatography with a Flame Photometric Detector

Special Analysis Section
Northern Laboratory Branch
Monitoring and Laboratory Division

06/12/02 version
Revised 08/12/02

Approved by:

Russell Grace, Manager
Special Analysis Section

Project P02-002

1. SCOPE

The method uses XAD-2 resin cartridges and a gas chromatograph with a flame photometric detector (FPD) for the determination of methamidophos and acephate for ambient and application air sample analysis. The Department of Pesticide Regulation (DPR) asked the Air Resources Board (ARB) to do ambient and application monitoring of methamidophos and acephate at a requested quantitation limit of 1 ng/m^3 and 5 ng/m^3, respectively, for ambient and 0.05 μg/m^3 and 0.1 μg/m^3, respectively, for application.

2. SUMMARY OF METHOD

XAD-2 resin cartridges are placed on the sampler for 24 hours at three (3) liters per minute (LPM) flow rate. The samples are stored in an ice chest or refrigerator until extracted with 3 milliliters (ml) of 10% acetone in ethyl acetate (EA). The method uses diazinon as an internal standard. The injection volume is 3 microliters (μl). A gas chromatograph with a flame photometric detector is used for analysis.

3. INTERFERENCES/LIMITATIONS

As with any method, interferences may be caused by contaminants in solvents, reagents, glassware, and other processing apparatus that can lead to discrete artifacts or elevated baselines. Method blanks, both solvent and resin, must be run concurrently with each analytical sample batch to detect possible interferences.

4. EQUIPMENT AND CONDITIONS

A. Instrumentation:

Hewlett-Packard 5890 Plus II Series gas chromatograph, with a flame photometric detector (FPD).

Hewlett-Packard 6890 Enhanced Parameters automated liquid samplers (ALS)

Column: Restek Rtx-1, 30 meter, 530 μm i.d., 0.5 μm film thickness.

GC Temperature Program: Oven initial 90 °C, hold 1 minute. Ramp to 260 °C @ 10 °C/min, hold for 1 minute.

Retention time:
RTx-1; FPD: methamidophos=4.47 min; acephate=6.78 min; and diazinon=11.13 min.

Flows: RTx-1 Column: He, 6.5 ml/min, 5.6 psi. (velocity: 49.8 cm/sec).

Injector: Splitless, 220° C.

Detector Temperature: FPD, 250°C

B. Auxiliary Apparatus:

Precleaned vials, 8 ml capacity with teflon caps.
XAD-2, 400/200 mg, SKC #226-30-06
Sonicator
GC vials with septum caps.

C. Reagants

Ethyl Acetate, Pesticide grade or better.
Acetone, HPLC grade
Methamidophos, Chem Service PS-676
Acephate, Chem Service PS-738
Diazinon, Chem Service PS-90, as the internal standard

5. ANALYSIS OF SAMPLES

5.1 It is necessary to analyze a solvent blank and an XAD-2 blank with each batch of samples. The blanks must be free of interferences in the targeted regions of the analytes. A solvent blank is analyzed after every tenth sample and after any sample that may result in possible carry-over contamination.

5.2 A six-point calibration curve shall be analyzed with each batch of samples. For methamidophos the calibration is at 5.0, 10.0, 20.0, 40.0, 60.0, and 100.0 ng/ml. For acephate the calibration is at 15.0, 30.0, 60.0, 80.0, 100.0, and 150.0 ng/ml. Diazinon, the internal standard, is at a concentration of 50 ng/ml. The calibration is run prior to each analytical sample batch. The analytical sample batch consists of the samples analyzed on the GC for any given day.

5.3 With each batch of samples analyzed, a laboratory resin blank and a laboratory resin control spike will be run concurrently. A laboratory blank is an unexposed XAD-2 cartridge prepared and analyzed the same way the samples are analyzed. A laboratory control spike is a XAD-2 cartridge spiked with a known amount of the target compounds. The laboratory control sample is prepared and analyzed the same way as the samples. Laboratory control samples should have recoveries that are at least 70% of the theoretical spiked value.

5.4 A calibration control check for methamidophos at 70.0 ng/ml and acephate at 100.0 ng/ml is run after the calibration and every ten samples and at the end of each sample batch. The value of the check must be within $\pm 3\sigma$ (the

standard deviation) or ±15% of the expected value whichever is greater. If the calibration check is outside the limit, then those samples in the batch after the last acceptable calibration check need to be reanalyzed.

5.5 The exposed XAD-2 is transferred into an 8 ml vial. To the vial add 3.0 ml of 10%acetone/EA. Cap and place the vial in a sonicator for 1 hour.

5.6 Transfer a one (1) ml aliquot of the sample into a GC vial. Add 5 µl of 10.0 µg/ml diazinon. Refrigerate the remaining portion for re-analysis if necessary.

5.7 The results are reported as ng/sample.

5.8 The atmospheric concentration is calculated according to:

$$\text{Conc } (\mu g/m^3) = \text{Extract Conc } (\mu g/ml) \times 3 \text{ ml} / \text{Air Volume Sampled } (m^3)$$

6. QUALITY ASSURANCE

A. Instrument Reproducibility

The reproducibility of the instrument, analytical method, and both detectors is established by analyzing five (5) 3.0 µl injections of methamidophos and acephate standard at three concentrations (low, mid, and high range). The low, mid and high concentrations for methamidophos were 5.0, 40.0 and 100.0 µg/ml. The concentrations for acephate were 15.0, 80.0 and 150.0 ng/ml. The corresponding internal standard response is also recorded.

B. Calibration

The six-point calibration curve is constructed using quadratic regression analysis. A curve cannot be used if its correlation coefficient is less than 0.995.

C. Calibration Check

A calibration check control is run after the calibration and every ten samples and at the end of the sample batch to verify the system is in calibration. The value of the check must be within ±3σ (the standard deviation) or ±15% of the expected value, whichever is greater. If the calibration check is outside the limit, then those samples preceding the out of limit check need to be reanalyzed.

D. Minimum Detection Limit

Detection limits are based on US EPA MDL calculation. Using the analysis of seven (7) replicates of a low-level XAD-2 spike, the method detection limit (MDL)

and the estimated quantitation limit (EQL) for methamidophos and acepate is calculated by: MDL = 3.14*(std dev values), where std dev = the standard deviation of the concentration calculated for the seven replicate spikes. The analytical results are reported with the low calibration standard corresponding to the requested EQL. Data above the requested EQL is reported to 3 significant figures. Results below the requested EQL but above the MDL are reported as DET (detected) and results less than the MDL are ND (nondetect).

The EQL for methamidophos is 6.14 ng/ml (4.28 ng/m^3) and for acephate 15.96 ng/ml (11.13 ng/m^3).

E. Collection and Extraction Efficiency (Recovery)

Methamidophos and acephate at a low and high level are spiked on XAD-2 cartridges (4 at each concentration). The spiked tubes are placed on field samplers with airflows of 3 LPM for 24 hours. The samples are extracted with 10%Acetone/EA and prepared as described in section 5. The average percent recovery should be $\pm$ 20% of the expected value.

Recoveries for acephate are in excess of 100 percent. Methamidophos recoveries are at least 70 percent.

F. Storage Stability

Storage stability studies on XAD-2 are done in triplicate over a three (3) week period. The XAD is spiked with methamidophos and acephate at a low and high concentration and stored in the freezer. The spikes are extracted and analyzed each week.

G. Breakthrough

XAD-2 spiked at 500 ng/ml each of the analytes, is placed on the sampler at 3 LPM to evaluate breakthrough. The methamidophos recovery was 78 +/-11% and the acephate was 145 +/- 9%. No analytes were detected in the back beds.

H. Safety

This procedure does not address all of the safety concerns associated with chemical analysis. It is the responsibility of the analyst to establish appropriate safety and health practices. For to the material safety data sheets (MSDS) of any chemicals used in this procedure hazard information and guidance refer.

APPENDIX III

Field Data Sheets for Acephate and Methamidophos

CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
001	FRS-AM-1-FS	MG-3	07/08/02	0727	3448.88	2.98	3.00	Field Spike	K	AC
			07/09/02	0631	3471.94	2.96	2.98		K	AC
002	FRS-AM-1	MH-3	07/08/02	0727	3448.88	2.98	3.00		K	AC
			07/09/02	0631	3471.94	2.96	2.98		K	AC
003	HES-AM-1	MD-3	07/08/02	0816	3463.57	2.98	3.00		K	AC
			07/09/02	0733	3486.85	2.94	2.96		K	AC
004	SJS-AM-1	MK-3	07/08/02	0835	2576.74	2.98	3.00		K	AC
			07/09/02	0754	2600.05	2.85	2.87		K	AC
005	THS-AM-1	MU-3	07/08/02	0853	3526.25	2.98	3.00	ETM failure. Pump was running on arrival. ETM replaced.	K	AC
			07/09/02	0814	3526.25	2.90	2.92		K	AC
006	CES-AM-1	MJ-3	07/08/02	0917	13011.76	2.98	3.00		K	AC
			07/09/02	0845	13035.24	2.90	2.92		K	AC
007	WRS-AM-1	MM-3	07/08/02	0956	3726.57	2.98	3.00		K	AC
			07/09/02	0923	3750.01	2.87	2.89		K	AC
008	FRS-AM-2	MH-3	07/09/02	0633	3471.98	2.98	3.00		K	AC
			07/10/02	0603	3495.48	2.98	3.00		K	AC
009	FRS-AM-2-C	MG-3	07/09/02	0633	3471.98	2.98	3.00		K	AC
			07/10/02	0603	3495.98	2.95	2.97		K	AC
010	FRS-AM-2-TS	N/A	07/09/02	0640	N/A	N/A	#VALUE!		K	AC
			N/A	N/A	N/A	N/A	#VALUE!		K	AC
011	FRS-AM-2-TB	N/A	07/09/02	0640	N/A	N/A	#VALUE!	TRIP BLANK	K	AC
			N/A	N/A	N/A	N/A	#VALUE!		K	AC
012	HES-AM-2	MD-3	07/09/02	0735	3486.88	2.98	3.00		K	AC
			07/10/02	0654	3510.21	2.92	2.94		K	AC
013	HES-AM-2-C	ME-3	07/09/02	0735	3486.88	2.98	3.00		K	AC
			07/10/02	0654	3510.21	2.97	2.99		K	AC
014	SJS-AM-2	MK-3	07/09/02	0756	2600.08	2.98	3.00		K	AC
			07/10/02	0721	2623.50	2.96	2.98		K	AC
015	SJS-AM-2-C	MF-3	07/09/02	0756	2600.08	2.98	3.00		K	AC
			07/10/02	0721	2623.50	3.00	3.02		K	AC
016	THS-AM-2	MU-3	07/09/02	0819	4578.54	2.98	3.00		K	AC
			07/10/02	0743	4601.94	2.97	2.99		K	AC
017	THS-AM-2-C	MB-3	07/09/02	0819	4578.54	2.98	3.00		K	AC
			07/10/02	0743	4601.94	2.95	2.97		K	AC
018	CES-AM-2	MJ-3	07/09/02	0847	13035.27	2.98	3.00		K	AC
			07/10/02	0816	13058.76	2.98	3.00		K	AC

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

Weather Codes: K = Clear, P = Partly Cloudy, C = ≥67% Cloudy, F = Fog, and R = Rain (any)

CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
019	CES-AM-2-C	MI-3	07/09/02	9847	13035.27	2.98	3.00		K	AC
			07/10/02	0816	13058.76	2.98	3.00		K	AC
020	WRS-AM-2	MM-3	07/09/02	0925	3750.05	2.98	3.00		K	AC
			07/10/02	0859	3773.62	2.96	2.98		K	AC
021	WRS-AM-2-C	MT-3	07/09/02	0925	3750.05	2.98	3.00		K	AC
			07/10/02	0859	3773.62	2.96	2.98		K	AC
022	FRS-AM-3	MH-3	07/10/02	0605	3495.53	2.98	3.00		K	AC
			07/11/02	0604	3519.49	2.97	2.99		K	AC
023	HES-AM-3	MD-3	07/10/02	0657	3510.25	2.98	3.00		K	AC
			07/11/02	0654	3534.19	2.99	3.01		K	AC
024	SJS-AM-3	MK-3	07/10/02	0723	2623.54	2.98	3.00		K	AC
			07/11/02	0714	2647.38	2.97	2.99		K	AC
025	THS-AM-3	MB-3	07/10/02	0744	4601.97	2.98	3.00		K	AC
			07/11/02	0732	4625.76	2.99	3.01		K	AC
026	CES-AM-3	MJ-3	07/10/02	0816	13058.78	2.98	3.00		K	AC
			07/11/02	0758	13082.46	2.98	3.00		K	AC
027	WRS-AM-3	MM-3	07/10/02	0901	3773.65	2.98	3.00		K	AC
			07/11/02	0834	3797.19	3.00	3.02		K	AC
028	FRS-AM-4	MH-3	07/11/02	0605	3519.51	2.98	3.00		K	AC
			07/12/02	0513	3542.65	2.82	2.84		K	AC
029	HES-AM-4	MD-3	07/11/02	0654	3534.21	2.98	3.00		K	AC
			07/12/02	0559	3557.30	2.92	2.94		K	AC
030	SJS-AM-4	MK-3	07/11/02	0714	2647.41	2.98	3.00		K	AC
			07/12/02	0620	2670.49	3.00	3.02		K	AC
031	THS-AM-4	MB-3	07/11/02	0734	4625.78	2.98	3.00		K	AC
			07/12/02	0636	4648.83	3.00	3.02		K	AC
032	CES-AM-4	MJ-3	07/11/02	0800	13082.48	2.98	3.00		K	AC
			07/12/02	0701	13105.51	2.98	3.00		K	AC
033	WRS-AM-4	MM-3	07/11/02	0834	3797.21	2.98	3.00		K	AC
			07/12/02	0735	3820.23	3.05	3.07		K	AC
034	FRS-AM-5	MH-3	07/15/02	0654	3542.68	2.98	3.00		K	JW
			07/16/02	0649	3566.59	3.00	3.02		K	JW
035	FRS-AM-5-FS	MG-3	07/15/02	0654	3542.68	2.98	3.00	FIELD SPIKE	K	JW
			07/16/02	0649	3566.59	2.98	3.00		K	JW
036	FRS-AM-5-TS	N/A	07/15/02	0708	N/A	N/A	#VALUE!	TRIP SPIKE	K	JW
			N/A	N/A	N/A	N/A	#VALUE!		K	JW

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

Weather Codes: K = Clear, P = Partly Cloudy, C = ≥67% Cloudy, F = Fog, and R = Rain (any)

CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
037	FRS-AM-5-TB	N/A	07/15/02	0708	N/A	N/A	#VALUE!	TRIP BLANK	K	JW
			N/A	N/A	N/A	N/A	#VALUE!		K	JW
038	HES-AM-5	MD-3	07/15/02	0759	3557.34	2.98	3.00		K	JW
			07/16/02	0745	3581.10	2.98	3.00		K	JW
039	SJS-AM-5	MK-3	07/15/02	0818	2670.53	2.98	3.00		K	JW
			07/16/02	0811	2694.41	2.98	3.00		K	JW
040	THS-AM-5	MB-3	07/15/02	0833	4648.86	2.98	3.00		K	JW
			07/16/02	0834	4672.88	3.00	3.02		K	JW
041	CES-AM-5	MJ-3	07/15/02	0900	13105.57	2.98	3.00		K	JW
			07/16/02	0908	13129.71	2.98	3.00		K	JW
042	WRS-AM-5	MM-3	07/15/02	0939	3820.29	2.98	3.00		K	JW
			07/16/02	0947	3844.43	3.00	3.02		K	JW
043	FRS-AM-6	MH-3	07/16/02	0654	3566.67	2.98	3.00		K	JW
			07/17/02	0629	3590.25	2.98	3.00		K	JW
044	FRS-AM-6-C	MG-3	07/16/02	0654	3566.67	2.98	3.00		K	JW
			07/17/02	0629	3590.25	2.98	3.00		K	JW
045	HES-AM-6	MD-3	07/16/02	0747	3581.15	2.98	3.00		K	JW
			07/17/02	0724	3604.76	2.98	3.00		K	JW
046	HES-AM-6-C	ME-3	07/16/02	0747	3581.15	2.98	3.00		K	JW
			07/17/02	0724	3604.76	2.97	2.99		K	JW
047	SJS-AM-6	MK-3	07/16/02	0814	2694.46	2.98	3.00		K	JW
			07/17/02	0749	2718.04	2.98	3.00		K	JW
048	SJS-AM-6-C	MF-3	07/16/02	0814	2694.46	2.98	3.00		K	JW
			07/17/02	0749	2718.04	2.98	3.00		K	JW
049	THS-AM-6	MB-3	07/16/02	0836	4672.92	2.98	3.00		K	JW
			07/17/02	0811	4696.49	2.92	2.94		K	JW
050	THS-AM-6-C	MU-3	07/16/02	0836	4672.92	2.98	3.00		K	JW
			07/17/02	0811	4696.49	3.05	3.07		K	JW
051	CES-AM-6	MJ-3	07/16/02	0911	13129.76	2.98	3.00		K	JW
			07/17/02	0842	13153.27	2.98	3.00		K	JW
052	CES-AM-6-C	MI-3	07/16/02	0911	13129.76	2.98	3.00		K	JW
			07/17/02	0842	13153.27	2.98	3.00		K	JW
053	WRS-AM-6	MM-3	07/16/02	0950	3844.48	2.98	3.00		K	JW
			07/17/02	0922	3868.01	2.98	3.00		K	JW
054	WRS-AM-6-C	MT-3	07/16/02	0950	3844.48	2.98	3.00		K	JW
			07/17/02	0922	3868.01	3.00	3.02		K	JW

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

Weather Codes: K = Clear, P = Partly Cloudy, C = ≥67% Cloudy, F = Fog, and R = Rain (any)

CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
055	FRS-AM-7	MH-3	07/17/02	0632	3590.31	2.98	3.00		K	JW
			07/18/02	0616	3614.04	2.97	2.99		K	JW
056	HES-AM-7	MD-3	07/17/02	0730	3604.85	2.98	3.00		K	JW
			07/18/02	0706	3628.46	2.98	3.00		K	JW
057	SJS-AM-7	MK-3	07/17/02	0753	2718.11	2.98	3.00		K	JW
			07/18/02	0732	2741.76	2.98	3.00		K	JW
058	THS-AM-7	MB-3	07/17/02	0815	4696.56	2.98	3.00		K	JW
			07/18/02	0749	4720.12	2.97	2.99		K	JW
059	CES-AM-7	MJ-3	07/17/02	0846	13153.34	2.98	3.00		K	JW
			07/18/02	0815	13176.82	2.98	3.00		K	JW
060	WRS-AM-7	MM-3	07/17/02	0927	3868.09	2.98	3.00		K	JW
			07/18/02	0846	3891.41	2.98	3.00		K	JW
061	FRS-AM-8	MH-3	07/18/02	0618	3614.08	2.98	3.00		K	JW
			07/19/02	0604	3637.84	2.95	2.97		K	JW
062	HES-AM-8	MD-3	07/18/02	0708	3628.49	2.98	3.00		K	JW
			07/19/02	0647	3652.14	2.97	2.99		K	JW
063	SJS-AM-8	MK-3	07/18/02	0734	2741.79	2.98	3.00		K	JW
			07/19/02	0707	2765.34	2.97	2.99		K	JW
064	THS-AM-8	MB-3	07/18/02	0750	4720.14	2.98	3.00		K	JW
			07/19/02	0722	4743.68	2.98	3.00		K	JW
065	CES-AM-8	MJ-3	07/18/02	0816	13176.84	2.98	3.00		K	JW
			07/19/02	0744	13200.31	2.98	3.00		K	JW
066	WRS-AM-8	MM-3	07/18/02	0847	3891.42	2.98	3.00		K	JW
			07/19/02	0824	3915.04	2.98	3.00		K	JW
067	FRS-AM-9	MH-3	07/22/02	0725	3637.85	2.98	3.00		K	AC
			07/23/02	0640	3661.11	2.97	2.99		K	AC
068	FRS-AM-9-FS	MG-3	07/22/02	0725	3637.85	2.98	3.00		K	AC
			07/23/02	0640	3661.11	2.98	3.00		K	AC
069	HES-AM-9	MD-3	07/22/02	0817	3652.15	2.98	3.00		K	AC
			07/23/02	0736	3675.48	2.92	2.94		K	AC
070	SJS-AM-9	MK-3	07/22/02	0836	2765.35	2.98	3.00		K	AC
			07/23/02	0805	2788.85	3.00	3.02		K	AC
071	THS-AM-9	MB-3	07/22/02	0848	4743.68	2.98	3.00		K	AC
			07/23/02	0825	4767.29	2.98	3.00		K	AC
072	CES-AM-9	MJ-3	07/22/02	0911	13200.32	2.98	3.00		K	AC
			07/23/02	0857	13224.08	2.89	2.91		K	AC

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

Weather Codes: K = Clear, P = Partly Cloudy, C = ≥67% Cloudy, F = Fog, and R = Rain (any)

CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initi O / O
073	WRS-AM-9	MM-3	07/22/02	0952	3915.05	2.98	3.00	Pesticide was just sprayed at office up wind of sampler, aprox 150'.	K	A(
			07/23/02	0936	3938.77	2.98	3.00		K	A(
074	FRS-AM-9-TS	N/A	07/22/02	1600	N/A	N/A	#VALUE!		K	A(
			N/A	N/A	N/A	N/A	#VALUE!		N/A	N/
075	FRS-AM-9-TB	N/A	07/22/02	1600	N/A	N/A	#VALUE!		K	A(
			N/A	N/A	N/A	N/A	#VALUE!		N/A	N/
076	FRS-AM-10	MH-3	07/23/02	0644	3661.18	2.98	3.00		K	A(
			07/24/02	0558	3684.41	2.97	2.99		K	A(
077	FRS-AM-10-C	MG-3	07/23/02	0644	3661.18	2.98	3.00		K	A(
			07/24/02	0558	3684.41	2.95	2.97		K	A(
078	HES-AM-10	MD-3	07/23/02	0737	3675.51	2.98	3.00		K	A(
			07/24/02	0652	3698.74	2.98	3.00		K	A(
079	HES-AM-10-C	ME-3	07/23/02	0737	3675.51	2.98	3.00		K	A(
			07/24/02	0652	3698.74	2.98	3.00		K	A(
080	SJS-AM-10	MK-3	07/23/02	0807	2788.87	2.98	3.00		K	A(
			07/24/02	0720	2812.09	3.00	3.02		K	A(
081	SJS-AM-10-C	MF-3	07/23/02	0807	2788.87	2.98	3.00		K	A(
			07/24/02	0720	2812.09	2.93	2.95		K	A(
082	THS-AM-10	MB-3	07/23/02	0827	4767.32	2.98	3.00		K	A(
			07/24/02	0741	4790.55	3.06	3.08		K	A(
083	THS-AM-10-C	MU-3	07/23/02	0827	4767.32	2.98	3.00		K	A(
			07/24/02	0741	4790.55	2.96	2.98		K	A(
084	CES-AM-10	MJ-3	07/23/02	0859	13224.11	2.98	3.00		K	A(
			07/24/02	0811	13247.31	2.98	3.00		K	A(
085	CES-AM-10-C	MI-3	07/23/02	0859	13224.11	2.98	3.00		K	A(
			07/24/02	0811	13247.31	3.08	3.10		K	A(
086	WRS-AM-10	MM-3	07/23/02	0938	3938.81	2.98	3.00		K	A(
			07/24/02	0859	3962.16	3.00	3.02		K	A(
087	WRS-AM-10-C	MT-3	07/23/02	0938	3938.81	2.98	3.00		K	A(
			07/24/02	0859	3962.16	3.04	3.06		K	A(
088	FRS-AM-11	MH-3	07/24/02	0600	3684.43	2.98	3.00		K	A(
			07/25/02	0554	3708.32	2.94	2.96		K	A(
089	HES-AM-11	MD-3	07/24/02	0654	3698.78	2.98	3.00		K	A(
			07/25/02	0646	3722.65	2.98	3.00		K	A(
090	SJS-AM-11	MK-3	07/24/02	0722	2812.12	2.98	3.00		K	A(
			07/25/02	0709	2835.90	2.93	2.95		K	A(

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

Weather Codes: K = Clear, P = Partly Cloudy, C = ≥67% Cloudy, F = Fog, and R = Rain (any)

CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
091	THS-AM-11	MB-3	07/24/02	0742	4790.58	2.98	3.00		K	AC
			07/25/02	0734	4814.44	2.94	2.96		K	AC
092	CES-AM-11	MJ-3	07/24/02	0813	13247.34	2.98	3.00		K	AC
			07/25/02	0800	13271.14	3.00	3.02		K	AC
093	WRS-AM-11	MM-3	07/24/02	0901	3962.19	2.98	3.00		K	AC
			07/25/02	0836	3985.77	2.94	2.96		K	AC
094	FRS-AM-12	MH-3	07/25/02	0555	3708.35	2.98	3.00		K	AC
			07/26/02	0523	3731.82	2.96	2.98		K	AC
095	HES-AM-12	MD-3	07/25/02	0648	3722.67	2.98	3.00		K	AC
			07/26/02	0616	3746.14	2.98	3.00		K	AC
096	SJS-AM-12	MK-3	07/25/02	0710	2835.92	2.98	3.00		K	AC
			07/26/02	0638	2859.38	2.98	3.00		K	AC
097	THS-AM-12	MB-3	07/25/02	0735	4814.45	2.98	3.00		K	AC
			07/26/02	0658	4837.83	2.98	3.00		K	AC
098	CES-AM-12	MJ-3	07/25/02	0801	13271.16	2.98	3.00		K	AC
			07/26/02	0720	13294.47	2.98	3.00		K	AC
099	WRS-AM-12	MM-3	07/25/02	0838	3985.79	2.98	3.00		K	AC
			07/26/02	0758	4009.13	2.98	3.00		K	AC
100	FRS-AM-13	MH-3	07/29/02	0657	3731.85	2.98	3.00		K	JW
			07/30/02	0634	3755.46	2.94	2.96		K	JW
101	FRS-AM-13-FS	MG-3	07/29/02	0657	3731.85	2.98	3.00	FIELD SPIKE	K	JW
			07/30/02	0634	3755.46	2.97	2.99		K	JW
102	FRS-AM-13-TS	N/A	07/29/02	0658	N/A	N/A	#VALUE!	TRIP SPIKE	K	JW
			N/A	N/A	N/A	N/A	#VALUE!		N/A	N/A
103	FRS-AM-13-TB	N/A	07/29/02	0658	N/A	N/A	#VALUE!	TRIP BLANK	K	JW
			N/A	N/A	N/A	N/A	#VALUE!		N/A	N/A
104	HES-AM-13	MD-3	07/29/02	0759	3746.17	2.98	3.00		K	JW
			07/30/02	0726	3769.62	2.98	3.00		K	JW
105	SJS-AM-13	MK-3	07/29/02	0817	2859.41	2.98	3.00		K	JW
			07/30/02	0752	2882.99	2.98	3.00		K	JW
106	THS-AM-13	MB-3	07/29/02	0836	4837.86	2.98	3.00		K	JW
			07/30/02	0812	4861.45	2.94	2.96		K	JW
107	CES-AM-13	MJ-3	07/30/02	0856	13294.51	2.98	3.00		K	JW
			07/30/02	0838	13318.20	2.98	3.00		K	JW
108	WRS-AM-13	MM-3	07/29/02	0925	4009.16	2.98	3.00		K	JW
			07/30/02	0917	4033.02	2.98	3.00		K	JW

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

Weather Codes: K = Clear, P = Partly Cloudy, C = ≥67% Cloudy, F = Fog, and R = Rain (any)

CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
109	FRS-AM-14	MH-3	07/30/02	0637	3755.51	2.98	3.00		K	JW
			07/31/02	0623	3779.28	2.99	3.01		K	JW
110	FRS-AM-14-C	MG-3	07/30/02	0637	3755.51	2.98	3.00		K	JW
			07/31/02	0623	3779.28	2.98	3.00		K	JW
111	HES-AM-14	MD-3	07/30/02	0728	3769.65	2.98	3.00		K	JW
			07/31/02	0715	3793.43	2.97	2.99		K	JW
112	HES-AM-14-C	ME-3	07/30/02	0728	3769.65	2.98	3.00		K	JW
			07/31/02	0715	3793.43	2.98	3.00		K	JW
113	SJS-AM-14	MK-3	07/30/02	0754	2883.04	2.98	3.00		K	JW
			07/31/02	0738	2906.75	2.95	2.97		K	JW
114	SJS-AM-14-C	MF-3	07/30/02	0754	2883.04	2.98	3.00		K	JW
			07/31/02	0738	2906.75	2.98	3.00		K	JW
115	THS-AM-14	MB-3	07/30/02	0814	4861.48	2.98	3.00		K	JW
			07/31/02	0759	4885.23	2.98	3.00		K	JW
116	THS-AM-14-C	MU-3	07/30/02	0814	4861.48	2.98	3.00		K	JW
			07/31/02	0759	4885.23	2.98	3.00		K	JW
117	CES-AM-14	MJ-3	07/30/02	0840	13318.23	2.98	3.00		K	JW
			07/31/02	0829	13342.06	2.96	2.98		K	JW
118	CES-AM-14-C	MI-3	07/30/02	0840	13318.23	2.98	3.00		K	JW
			07/31/02	0829	13342.06	2.98	3.00		K	JW
119	WRS-AM-14	MM-3	07/30/02	0918	4033.04	2.98	3.00		K	JW
			07/31/02	0908	4056.88	2.98	3.00		K	JW
120	WRS-AM-14-C	MT-3	07/30/02	0918	4033.04	2.98	3.00		K	JW
			07/31/02	0908	4056.88	2.98	3.00		K	JW
121	FRS-AM-15	MH-3	07/31/02	0627	3779.34	2.98	3.00		K	JW
			08/01/02	0624	3803.29	2.98	3.00		K	JW
122	HES-AM-15	MD-3	07/31/02	0716	3793.45	2.98	3.00		K	JW
			08/01/02	0713	3817.40	2.98	3.00		K	JW
123	SJS-AM-15	MK-3	07/31/02	0740	2906.79	2.98	3.00		K	JW
			08/01/02	0737	2930.74	2.97	2.99		K	JW
124	THS-AM-15	MB-3	07/31/02	0800	4885.26	2.98	3.00		K	JW
			08/01/02	0754	4909.15	2.97	2.99		K	JW
125	CES-AM-15	MJ-3	07/31/02	0831	13342.08	2.98	3.00		K	JW
			08/01/02	0819	13365.87	2.97	2.99		K	JW
126	WRS-AM-15	MM-3	07/31/02	0909	4056.90	2.98	3.00		K	JW
			08/01/02	0852	4080.61	2.96	2.98		K	JW

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

Weather Codes: K = Clear, P = Partly Cloudy, C = ≥67% Cloudy, F = Fog, and R = Rain (any)

CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
127	FRS-AM-16	MH-3	08/01/02	0625	3803.31	2.98	3.00		K	JW
			08/02/02	0600	3826.89	2.97	2.99		K	JW
128	HES-AM-16	MD-3	08/01/02	0714	3817.41	2.98	3.00		K	JW
			08/02/02	0647	3840.96	2.98	3.00		K	JW
129	SJS-AM-16	MK-3	08/01/02	0738	2930.75	2.98	3.00		K	JW
			08/02/02	0706	2954.22	2.98	3.00		K	JW
130	THS-AM-16	MB-3	08/01/02	0756	4909.18	2.98	3.00		K	JW
			08/02/02	0723	4932.63	2.97	2.99		K	JW
131	CES-AM-16	MJ-3	08/01/02	0820	13365.90	2.98	3.00		K	JW
			08/02/02	0745	13389.31	2.98	3.00		K	JW
132	WRS-AM-16	MM-3	08/01/02	0853	4080.63	2.98	3.00		K	JW
			08/02/02	0821	4104.09	2.98	3.00		K	JW
133	FRS-AM-17	MH-3	08/05/02	0725	3826.99	2.98	3.00		K	AC
			08/06/02	0701	3850.58	3.03	3.05		K	AC
134	FRS-AM-17-FS	MG-3	08/05/02	0722	3826.94	2.98	3.00	FIELD SPIKE	K	AC
			08/06/02	0701	3850.58	2.99	3.01		K	AC
135	HES-AM-17	MD-3	08/05/02	0814	3840.97	2.98	3.00		K	AC
			08/06/02	0756	3864.66	3.00	3.02		K	AC
136	SJS-AM-17	MK-3	08/05/02	0834	2954.23	2.98	3.00	Dirt moving in adjacent lot with bucket loader.	K	AC
			08/06/02	0819	2977.97	3.04	3.06		K	AC
137	THS-AM-17	MB-3	08/05/02	0851	4932.65	2.98	3.00	Painting school in progress.	K	AC
			08/06/02	0840	4956.47	2.99	3.01		K	AC
138	CES-AM-17	MJ-3	08/05/02	0915	13389.33	2.98	3.00	PG&E working on nearby power pole.	K	AC
			08/06/02	0908	13413.21	2.92	2.94		K	AC
139	WRS-AM-17	MM-3	08/05/02	0952	4104.10	2.98	3.00	Field burning downwind, 1000 meters away.	K	AC
			08/06/02	0947	4128.02	2.93	2.95		K	AC
140	FRS-AM-17-TB	N/A	08/05/02	1000	N/A	N/A	#VALUE!	TRIP BLANK	K	AC
			N/A	N/A	N/A	N/A	#VALUE!		N/A	N/A
141	FRS-AM-17-TS	N/A	08/05/02	1000	N/A	N/A	#VALUE!	TRIP SPIKE	K	AC
			N/A	N/A	N/A	N/A	#VALUE!		N/A	N/A
142	FRS-AM-18	MH-3	08/06/02	0704	3850.62	2.98	3.00		K	AC
			08/07/02	0633	3874.11	2.99	3.01		K	AC
143	FRS-AM-18-C	MG-3	08/06/02	0704	3850.62	2.98	3.00		K	AC
			08/07/02	0633	3874.11	3.04	3.06		K	AC
144	HES-AM-18	MD-3	08/06/02	0757	3864.69	2.98	3.00		K	AC
			08/07/02	0726	3888.16	2.96	2.98		K	AC

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

Weather Codes: K = Clear, P = Partly Cloudy, C = ≥67% Cloudy, F = Fog, and R = Rain (any)

CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
145	HES-AM-18-C	ME-3	08/06/02	0757	3864.69	2.98	3.00		K	AC
			08/07/02	0726	3888.16	2.98	3.00		K	AC
146	SJS-AM-18	MK-3	08/06/02	0822	2978.02	2.98	3.00	Construction "dirt mound" in adjacent lot.	K	AC
			08/07/02	0755	3001.59	3.00	3.02		K	AC
147	SJS-AM-18-C	MF-3	08/06/02	0822	2978.02	2.98	3.00	Construction "dirt mound" in adjacent lot.	K	AC
			08/07/02	0755	3001.59	3.03	3.05		K	AC
148	THS-AM-18	MB-3	08/06/02	0842	4956.49	2.98	3.00		K	AC
			08/07/02	0820	4980.14	2.97	2.99		K	AC
149	THS-AM-18-C	MU-3	08/06/02	0842	4956.49	2.98	3.00		K	AC
			08/07/02	0820	4980.14	2.96	2.98		K	AC
150	CES-18-AM	MJ-3	08/06/02	0909	13413.24	2.98	3.00		K	AC
			08/07/02	0848	13436.89	3.00	3.02		K	AC
151	CES-18-AM-C	MI-3	08/06/02	0909	13413.24	2.98	3.00		K	AC
			08/07/02	0848	13436.89	2.93	2.95		K	AC
152	WRS-AM-18	MM-3	08/06/02	0949	4128.04	2.98	3.00		K	AC
			08/07/02	0927	4151.69	2.98	3.00		K	AC
153	WRS-AM-18-C	MT-3	08/06/02	0949	4128.04	2.98	3.00		K	AC
			08/07/02	0927	4151.69	2.93	2.95		K	AC
154	FRS-AM-19	MH-3	08/07/02	0635	3874.14	2.98	3.00		K	AC
			08/08/02	0608	3897.68	2.94	2.96		K	AC
155	HES-AM-19	MD-3	08/07/02	0728	3888.21	2.98	3.00	Grinding Metal and spray painting in area below sampler.	K	AC
			08/08/02	0658	3911.71	2.91	2.93		K	AC
156	SJS-AM-19	MK-3	08/07/02	0758	3001.62	2.98	3.00	Construction "dirt mound" in adjacent lot.	K	AC
			08/08/02	0718	3024.97	2.98	3.00		K	AC
157	THS-AM-19	MB-3	08/07/02	0823	4980.17	2.98	3.00	School painting in prgoress.	K	AC
			08/08/02	0735	5003.39	3.00	3.02		K	AC
158	CES-AM-19	MJ-3	08/07/02	0850	13436.92	2.98	3.00		K	AC
			08/08/02	0800	13460.09	2.95	2.97		K	AC
159	WRS-AM-19	MM-3	08/07/02	0930	4151.70	2.98	3.00		K	AC
			08/08/02	0838	4174.84	2.95	2.97		K	AC
160	FRS-AM-20	MH-3	08/08/02	0609	3897.71	2.98	3.00		K	AC
			08/09/02	0522	3920.93	3.00	3.02		K	AC
161	HES-AM-20	MD-3	08/08/02	0659	3911.73	2.98	3.00		K	AC
			08/09/02	0612	3934.94	2.98	3.00		K	AC
162	SJS-AM-20	MK-3	08/08/02	0720	3024.99	2.98	3.00		K	AC
			08/09/02	0630	3048.16	2.96	2.98		K	AC

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

Weather Codes: K = Clear, P = Partly Cloudy, C = ≥67% Cloudy, F = Fog, and R = Rain (any)

CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
163	THS-AM-20	MB-3	08/08/02	0737	5003.41	2.98	3.00	School painting in prgoress.	K	AC
			08/09/02	0644	5026.54	2.95	2.97		K	AC
164	CES-AM-20	MJ-3	08/08/02	0802	13460.11	2.98	3.00		K	AC
			08/09/02	0708	13483.22	2.93	2.95		K	AC
165	WRS-AM-20	MM-3	08/08/02	0839	4174.85	2.98	3.00	Farm operations acros street.	K	AC
			08/09/02	0742	4197.90	2.96	2.98		K	AC
166	FRS-AM-21	MH-3	08/12/02	0703	3920.95	2.98	3.00		K	JW
			08/13/02	0636	3944.49	2.99	3.01		K	JW
167	FRS-AM-21-FS	MG-3	08/12/02	0703	3920.95	2.98	3.00	FIELD SPIKE	K	JW
			08/13/02	0636	3944.49	2.98	3.00		K	JW
168	FRS-AM-21-TS	N/A	08/12/02	0710	N/A	N/A	#VALUE!	TRIP SPIKE	K	JW
			N/A	N/A	N/A	N/A	#VALUE!		N/A	N/A
169	FRS-AM-21-TB	N/A	08/12/02	0710	N/A	N/A	#VALUE!	TRIP BLANK	K	JW
			N/A	N/A	N/A	N/A	#VALUE!		N/A	N/A
170	HES-AM-21	MD-3	08/12/02	0758	3934.98	2.98	3.00		K	JW
			08/13/02	0725	3958.44	2.98	3.00		K	JW
171	SJS-AM-21	MK-3	08/12/02	0819	3048.18	2.98	3.00		K	JW
			08/13/02	0748	3071.66	2.90	2.92		K	JW
172	THS-AM-21	MB-3	08/12/02	0835	5026.56	2.98	3.00		K	JW
			08/13/02	0807	5050.09	2.96	2.98		K	JW
173	CES-AM-21	MJ-3	08/12/02	0858	13483.25	2.98	3.00		K	JW
			08/13/02	0834	13506.84	2.97	2.99		K	JW
174	WRS-AM-21	MM-3	08/12/02	0929	4197.93	2.98	3.00		K	JW
			08/13/02	0908	4221.57	2.90	2.92		K	JW
175	FRS-AM-22	MH-3	08/13/02	0637	3944.52	2.98	3.00		K	JW
			08/14/02	0619	3968.21	2.97	2.99		K	JW
176	FRS-AM-22-C	MG-3	08/13/02	0637	3944.52	2.98	3.00		K	JW
			08/14/02	0619	3968.21	2.98	3.00		K	JW
177	HES-AM-22	MD-3	08/13/02	0727	3958.46	2.98	3.00	SPRAYING FIELD ACROSS ROAD. ETM METER FAILED AT 14.4 HRS.	K	JW
			08/14/02	0712	3972.95	2.98	3.00		K	JW
178	HES-AM-22-C	ME-3	08/13/02	0727	3958.46	2.98	3.00	SPRAYING FIELD ACROSS ROAD. ETM METER FAILED AT 14.4 HRS.	K	JW
			08/14/02	0712	3972.95	2.97	2.99		K	JW
179	SJS-AM-22	MK-3	08/13/02	0750	3071.69	2.98	3.00		K	JW
			08/14/02	0736	3095.45	3.00	3.02		K	JW
180	SJS-AM-22-C	MF-3	08/13/02	0750	3071.69	2.98	3.00		K	JW
			08/14/02	0736	3095.45	2.99	3.01		K	JW

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

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CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
181	THS-AM-22	MB-3	08/13/02	0808	5050.11	2.98	3.00		K	JW
			08/14/02	0754	5073.87	2.99	3.01		K	JW
182	THS-AM-22-C	MU-3	08/13/02	0808	5050.11	2.98	3.00		K	JW
			08/14/02	0754	5073.87	2.98	3.00		K	JW
183	CES-AM-22	MJ-3	08/13/02	0835	13506.86	2.98	3.00		K	JW
			08/14/02	0822	13530.65	3.05	3.07		K	JW
184	CES-AM-22-C	MI-3	08/13/02	0835	13506.86	2.98	3.00		K	JW
			08/14/02	0822	13530.65	3.08	3.10		K	JW
185	WRS-AM-22	MM-3	08/13/02	0910	4221.61	2.98	3.00		K	JW
			08/14/02	0856	4245.37	2.98	3.00		K	JW
186	WRS-AM-22-C	MT-3	08/13/02	0910	4221.61	2.98	3.00		K	JW
			08/14/02	0856	4245.37	2.98	3.00		K	JW
187	FRS-AM-23	MH-3	08/14/02	0621	3968.25	2.98	3.00		K	JW
			08/15/02	0607	3992.01	2.93	2.95		K	JW
188	HES-AM-23	MD-3	08/14/02	0714	N/A	2.98	3.00	E.T. METER FAILED - NO SPARE.	K	JW
			08/15/02	0657	N/A	3.03	3.05		K	JW
189	SJS-AM-23	MK-3	08/14/02	0738	3095.49	2.98	3.00		K	JW
			08/15/02	0718	3119.15	2.98	3.00		K	JW
190	THS-AM-23	MB-3	08/14/02	0755	5073.90	2.98	3.00		K	JW
			08/15/02	0734	5097.54	2.97	2.99		K	JW
191	CES-AM-23	MJ-3	08/14/02	0824	13530.68	2.98	3.00		K	JW
			08/15/02	0800	13554.28	2.95	2.97		K	JW
192	WRS-AM-23	MM-3	08/14/02	0858	4245.40	2.98	3.00		K	JW
			08/15/02	0834	4269.01	2.94	2.96		K	JW
193	FRS-AM-24	MH-3	08/15/02	0608	3992.03	2.98	3.00		K	JW
			08/16/02	0603	4015.96	2.97	2.99		K	JW
194	HES-AM-24	MD-3	08/15/02	0658	N/A	2.98	3.00	E.T. METER FAILED - NO SPARE. SPRAYING IN FIELD SOUTH OF SCHOOL.	K	JW
			08/16/02	0649	N/A	2.98	3.00		K	JW
195	SJS-AM-24	MK-3	08/15/02	0719	3119.17	2.98	3.00	SPRAYING EAST OF SCHOOL - 8/16/02	K	JW
			08/16/02	0707	3142.98	3.04	3.06		K	JW
196	THS-AM-24	MB-3	08/15/02	0735	5097.56	2.98	3.00		K	JW
			08/16/02	0724	5121.37	2.97	2.99		K	JW
197	CES-AM-24	MJ-3	08/15/02	0801	13554.30	2.98	3.00		K	JW
			08/16/02	0746	13578.05	2.98	3.00		K	JW
198	WRS-AM-24	MM-3	08/15/02	0835	4269.03	2.98	3.00		K	JW
			08/16/02	0824	4292.84	2.98	3.00		K	JW

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

Weather Codes: K = Clear, P = Partly Cloudy, C = ≥67% Cloudy, F = Fog, and R = Rain (any)

CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
199	FRS-AM-25-TS	N/A	08/19/02	0717	N/A	N/A	#VALUE!	TRIP SPIKE	K	AC
			N/A	N/A	N/A	N/A	#VALUE!		K	AC
200	FRS-AM-25	MH-3	08/19/02	0725	4016.01	2.98	3.00		K	AC
			08/20/02	0711	4039.79	3.04	3.06		K	AC
201	FRS-AM-25-FS	MG-3	08/19/02	0725	4016.01	2.98	3.00	FIELD SPIKE	K	AC
			08/20/02	0711	4039.79	3.05	3.07		K	AC
202	FRS-AM-25-TB	N/A	08/19/02	0728	N/A	N/A	#VALUE!	TRIP BLANK	K	AC
			N/A	N/A	N/A	N/A	#VALUE!		K	AC
203	HES-AM-25	MD-3	08/19/02	0818	0.55	2.98	3.00		K	AC
			08/20/02	0806	24.37	2.97	2.99		K	AC
204	SJS-AM-25	MK-3	08/19/02	0838	3143.01	2.98	3.00	CONSTRUCTION "DIGGING" IN ADJACENT LOT.	K	AC
			08/20/02	0832	3166.91	3.00	3.02		K	AC
205	THS-AM-25	MB-3	08/19/02	0854	5121.39	2.98	3.00		K	AC
			08/20/02	0854	5145.38	2.98	3.00		K	AC
206	CES-AM-25	MJ-3	08/19/02	0918	13578.06	2.98	3.00		K	AC
			08/20/02	0919	13602.08	2.99	3.01		K	AC
207	WRS-AM-25	MM-3	08/19/02	0956	4292.85	2.98	3.00		K	AC
			08/20/02	0956	4316.85	3.00	3.02		K	AC
208	FRS-AM-26	MH-3	08/20/02	0714	4039.82	2.98	3.00		K	AC
			08/21/02	0616	4062.87	2.98	3.00		K	AC
209	FRS-AM-26-C	MG-3	08/20/02	0714	4039.82	2.98	3.00		K	AC
			08/21/02	0616	4062.87	2.99	3.01		K	AC
210	HES-AM-26	MD-3	08/20/02	0809	24.40	2.98	3.00		K	AC
			08/21/02	0710	47.43	2.98	3.00		K	AC
211	HES-AM-26-C	ME-3	08/20/02	0809	24.40	2.98	3.00		K	AC
			08/21/02	0710	47.43	2.98	3.00		K	AC
212	SJS-AM-26	MK-3	08/20/02	0834	3166.93	2.98	3.00	CONSTRUCTION "DIGGING" IN ADJACENT LOT.	K	AC
			08/21/02	0736	3189.98	2.96	2.98		K	AC
213	SJS-AM-26-C	MF-3	08/20/02	0834	3166.93	2.98	3.00	CONSTRUCTION "DIGGING" IN ADJACENT LOT.	K	AC
			08/21/02	0736	3189.98	2.99	3.01		K	AC
214	THS-AM-26	MB-3	08/20/02	0856	5145.41	2.98	3.00		K	AC
			08/21/02	0758	5168.47	2.89	2.91		K	AC
215	THS-AM-26-C	MU-3	08/20/02	0856	5145.41	2.98	3.00		K	AC
			08/21/02	0758	5168.47	2.97	2.99		K	AC
216	CES-AM-26	MJ-3	08/20/02	0921	13602.10	2.98	3.00		K	AC
			08/21/02	0833	13625.32	3.00	3.02		K	AC

MFM Used #: 5063 **Slope:** 0.9979 **Intercept:** 0.0308

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CARTRIDGE FIELD LOG SHEET

Project: Acephate and Methamidophos Ambient Air Monitoring in Fresno County

Project #: P-02-003 On Flow: 3.00 ±0.02lpm Off Flow: 3.00 lpm ±10%

Log #	Sample Name	Sampler ID Number	Date On / Off	Time On / Off	Counter On / Off	Flow On / Off	True Flow	Comments	Weather K,P,C,F&R On / Off	Initials On / Off
217	CES-AM-26-C	MI-3	08/20/02	0921	13602.10	2.98	3.00		K	AC
			08/21/02	0833	13625.32	2.98	3.00		K	AC
218	WRS-AM-26	MM-3	08/20/02	0958	4316.87	2.98	3.00		K	AC
			08/21/02	0924	4340.33	2.95	2.97		K	AC
219	WRS-AM-26-C	MT-3	08/20/02	0958	4316.87	2.98	3.00		K	AC
			08/21/02	0924	4340.33	2.92	2.94		K	AC
220	FRS-AM-27	MH-3	08/21/02	0619	4062.90	2.98	3.00		K	AC
			08/22/02	0624	4086.99	2.93	2.95		K	AC
221	HES-AM-27	MD-3	08/21/02	0713	47.46	2.98	3.00		K	AC
			08/22/02	0720	71.59	2.95	2.97		K	AC
222	SJS-AM-27	MK-3	08/21/02	0738	3190.01	2.98	3.00	CONSTRUCTION "DIGGING" IN ADJACENT LOT.	K	AC
			08/22/02	0748	3214.19	2.94	2.96		K	AC
223	THS-AM-27	MB-3	08/21/02	0801	5168.50	2.98	3.00		K	AC
			08/22/02	0809	5192.63	2.98	3.00		K	AC
224	CES-AM-27	MJ-3	08/21/02	0836	13625.34	2.98	3.00		K	AC
			08/22/02	0835	13649.34	2.98	3.00		K	AC
225	WRS-AM-27	MM-3	08/21/02	0926	4340.36	2.98	3.00		K	AC
			08/22/02	0911	4364.11	2.97	2.99		K	AC
226	FRS-AM-28	MH-3	08/22/02	0627	4087.04	2.98	3.00		K	AC
			08/23/02	0630	4111.10	3.00	3.02		K	AC
227	HES-AM-28	MD-3	08/22/02	0721	71.62	2.98	3.00		K	AC
			08/23/02	0718	95.57	2.94	2.96		K	AC
228	SJS-AM-28	MK-3	08/22/02	0750	3214.21	2.98	3.00	CONSTRUCTION "DIGGING" IN ADJACENT LOT.	K	AC
			08/23/02	0744	3238.12	2.98	3.00		K	AC
229	THS-AM-28	MB-3	08/22/02	0811	5192.64	2.98	3.00		K	AC
			08/23/02	0807	5216.57	2.97	2.99		K	AC
230	CES-AM-28	MJ-3	08/22/02	0837	13649.37	2.98	3.00		K	AC
			08/23/02	0851	13673.61	2.87	2.89		K	AC
231	WRS-AM-28	MM-3	08/22/02	0913	4364.12	2.98	3.00		K	AC
			08/23/02	0927	4388.36	2.97	2.99		K	AC

MFM Used #: 5063 **Slope:** 0.9976 **Intercept:** 0.0308

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Weather Codes: K = Clear, P = Partly Cloudy, C = ≥67% Cloudy, F = Fog, and R = Rain (any)

APPENDIX IV

Laboratory Response to the DPR Comments
on the Draft Monitoring Report

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Winston H. Hickox
Agency Secretary

Gray Davis
Governor

MEMORANDUM

TO: Webster Tasat, Manager
Operations Planning and Assessment Section
Quality Management Branch

FROM: Russell Grace, Manager
Special Analysis Section
Northern Laboratory Branch

DATE: October 30, 2003

SUBJECT: RESPONSE TO DPR COMMENTS OF THE ACEPHATE AND METHAMIDOPHOS 2002 REPORT

The following is in response to the comments from DPR on the "Draft Report for the 2002 Ambient Air Monitoring for Acephate and Methamidophos in Fresno County." This memo only responds to those comments relating to the laboratory aspects of the report.

Comment 2: Page 8, the 2nd and 3rd paragraphs: The field spike recoveries were not satisfactory. The lab statement of some interaction between XAD resin and the target compound maybe occurring and acephate unstable in solution (page 8, the 5th paragraph) could not explain the acephate recoveries ranging from 48% to 163% (page 39, Table 10). Additional discussion should be provided. The discussion should include which, if any, samples may have high recovery due to extract storage longer than a few hours.

Response: Considering the recoveries from the laboratory and trip spikes, the extraction method is acceptable. It would then appear that some matrix effect is occurring as a result of the air flow through the tubes in the field spikes. The field spike recoveries performed in Sacramento during method development were acceptable. The acephate recovery was "high" for the lower spiked samples as noted in the Collection and Extraction Efficiency table. Since the samples were predominantly <MDL, the actual values may be lower based on the "high" recoveries of the field spikes.

Acephate is very unstable after extraction and there is no explanation that we know of that would account for the wide variability of recovery efficiencies. However, the 48% and 163% recoveries of the field spikes appear to be outliers compared to the remainder of the field spike recovery data. Nevertheless, all of the samples were analyzed on the day of extraction and were never in extract storage for longer than a few hours. We have expanded the discussion in the lab report in this area.

Comment 5: Appendix, page 12: Was acephate spiked at 15 ng/ml or 25 ng/ml?

Response: I am unable to reply to this comment. The copy of the ARB report that I received did not include appendices and I am not sure to what this comment refers.

Comment 6: Appendix, page 13, Table 13: The sample collection and extraction efficiencies were not satisfactory. The standard operating procedure stated that the average percent recovery should be ±20% of the expected value (the last sentence on Appendix, page 40, section E). However, recoveries of 193.0% ±29.6 and 46.4% ±2.1 were reported for acephate at low spike and methamidophos at high spike, respectively. It would help us to evaluate the results if a detailed description and a table with all the results of the collection and extraction efficiency test could be provided.

Response: The SOP does not require the average percent recovery to be ±20%. This is actually a target we would like to achieve but with any given compound may not be practical, though this does not in and of itself invalidate the method nor the data.

With respect to the acephate recoveries, the high level spikes have a good recovery while the low level spikes have high recovery, again possibly due to other interferences. The methamidophos pattern is the opposite; the low level spikes have a good recovery while the high level spikes have low recovery.

The reported sample results are <MDL (with only a few exceptions), so our lab results would be measuring on the "high" side for acephate and as expected for methamidophos. Therefore, the "true" sample values are actually lower than reported for acephate.

As stated above, acephate is not a very stable compound. There may be other factors in the ambient air of the testing area that may also be contributing to the rapid breakdown of the compound. We have expanded the discussion in the lab report in this area.

We are including a revised "Air Sampling Cartridge Method Development and Analytical Results of Ambient Air Monitoring in Fresno County for Methamidophos and Acephate" lab report. If you have any questions, please contact Russell Grace at 322-8959 or T.E. Houston at 322-2365.

Attachment

cc: T.E. Houston
Kevin Mongar